The Effect of Taxpayer Service Provision on Tax Compliance for Large Taxpayers in Jamaica

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Abstract

This research examines the effect of the provision of taxpayer services on filing and payment of the corporate income tax (CIT) and general consumption tax (GCT) for large taxpayers in Jamaica. We focus on the taxpayer's decision to file and pay taxes conditional on their reporting decision. These are important margins of response particularly in developing countries with relatively weak tax administrations that find it difficult to collect reported taxes. The empirical strategy adopts a regression discontinuity design (RDD) that exploits an exogenous jump in the intensity of taxpayer service delivery, which occurs when a taxpayer reaches gross receipts of J$500 million (US$5.7 million) and is selected into the large taxpayer office (LTO). The results indicate null effects for the CIT but positive filing and payment compliance effects for the GCT. The contrasting results for the CIT and GCT may be due to the relatively weaker legal enforcement framework of the former. The results provide suggestive evidence of a complementarity between the strength of the legal enforcement framework of the taxing regime and the provision of taxpayer services.

Keywords: tax compliance, filing, payment, taxpayer services, regression discontinuity

JEL codes: H25, H26, H32.

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1. Introduction

The fiscal landscape across developing countries is characterized by significant revenue mobilization challenges, stemming from *inter alia* critically low levels of tax compliance. In exploring the potential causes of low tax compliance in developing and transition economies, Alm and Martinez – Vazquez (2003) attribute much of the effects to weak fiscal institutions. They stress that the role of tax administration surpasses merely securing revenues for the state and must also include ensuring taxpayer satisfaction, equity and social welfare. These arguments are in line with more recent views that highlight the need for a balance between enforcement and more facilitatory approaches, grounded in a commitment to an implicit 'psychological' contract between the taxpayer and the tax administration (Feld and Frey, 2002; Kirchler et al. 2008).[1]

The thrust of recent tax administration reforms across countries aim at increasing both enforced and voluntary compliance within the context of an overarching risk based approach. In particular, tax administrations recognize the importance of tax morale or non-pecuniary factors in determining taxpayer compliance and have sought to complement traditional enforcement strategies with a softer approach – such as the provision taxpayer services. Additionally, to mitigate risk exposure, tax administrations have sought to adopt a more strategic focus on individuals and firms that pose the greatest risk to the revenue – example large taxpayers.

This essay examines the effect of the provision of taxpayer services – through the Large Taxpayer Office (LTO), on the timeliness and completeness of filing and payment of the corporate

[1] Kirchler (2007) argues that the cops and robbers approach to tax administration fuels distrust and adversarial tendencies between the tax administration and the taxpayer, but a service - client approach can encourage greater cooperation and improve voluntary compliance.

income tax (CIT) and general consumption tax (GCT) for large taxpayers in Jamaica. We focus on the taxpayer's decision to file and pay taxes conditional on reporting positive tax liabilities. This is an important compliance margin, particularly in developing countries with relatively weak tax administrations that find it difficult to collect reported taxes. Moreover, where tax administration resources are limited, and where the outcomes of expensive audits are uncertain, it may be more prudent to focus on collecting pledged taxes.

The empirical strategy exploits quasi-experimental variation in the intensity of service delivery that occurs for taxpayers marginally selected into the LTO. A key criteria for selection into the LTO is having gross receipts greater than or equal to an arbitrary threshold of J$500 million (US$5.7 million).[2] We use a regression discontinuity design (RDD) that exploits the discrete jump in the probability of selection at the threshold. This approach compares the compliance behavior of those located just to the right of the threshold – that are selected into the LTO, to otherwise similar taxpayers located just the left of the threshold – that are marginally not selected into the LTO. Assuming all other key taxpayer characteristics transition smoothly across the threshold, the RDD estimates are causal.

This research relates to a growing literature that use experimental and quasi-experimental approaches to examine the effect of enforcement and tax morale factors on tax compliance for developing countries in the Latin America and Caribbean (LAC) region (Carillo et al., 2014; Ortega and Scartascini, 2015; Castro and Scartascini, 2013; Pomeranz, 2013). This is the first for an English speaking Caribbean country. This paper also links closely to literature that examine taxpayers' behavioral response to discontinuities in the tax structure. Whereas some studies

[2] The US dollar conversion was done using a 4 year (2009 – 2012) average annual exchange rate of $87.35 JMD to $1 USD using data from the Bank of Jamaica.

examine behavioral responses to notches or kinks in the tax rate structure (Saez, 2010; Keleven and Waseem 2012), others leverage exogenous changes in monitoring and enforcement intensity that occur around some revenue threshold (Almunia and Rodriguez, 2014; Sanchez, 2013). This paper relates most closely with this second strand of literature, but instead of an 'enforcement notch' we examine compliance response to changes in the intensity of taxpayer service delivery.

Firs evidence of the compliance effects of taxpayer services come from a handful of lab and field experiments (Alm et al, 2011; Vossler et.al., 2011; Mckee et al, 2011; Kosonen and Ropponen, 2013) and focus on taxpayer information services. These studies find generally positive effects on filing and reporting compliance but also report limits of the impact of taxpayer information services. Mckee et al. (2011) finds that post audit, subjects are less likely to request information assistance and are more likely to evade. Kosonen and Ropponen (2013) find that taxpayer information services are ineffective in boosting compliance for relatively more complex aspects of the VAT law in Finland. In this paper we go beyond examining the effect of taxpayer information services and examine the effects of a broad range of taxpayer services. We also explore the effects of taxpayer services conditional on the strength of the legal enforcement framework of the taxing regime to test the relationship between service delivery and enforcement strength.

We find that taxpayer service provision did not significantly improve filing or payment compliance for the CIT, but had generally positive compliance effects for the GCT. Taxpayers are (22 pp) less likely to file GCT returns late and also reduce the number of days late that returns are filed by about 14 days. Taxpayers are also (17 pp) less likely to pay GCT late and reduce the number of days late that payments are made by about 247 days. The amount of GCT and the share of reported GCT paid on time increases by about J$4 million and 27 percent respectively. We attribute the null effects for the CIT and positive compliance effects for the GCT to the relatively

stronger legal enforcement framework of the latter. We take this as suggestive evidence of a complementarity in the relationship between the strength of the legal enforcement framework of the taxing regime and the provision of taxpayer services. We also find heterogeneous effects in the case of the GCT, with positive compliance response for non-financial sector taxpayers and non-importers but null effects for financial sector taxpayers and importers. We attribute this to possible substitutability between taxpayer service provision and external enforcement mechanisms such as industry oversight bodies and tax compliance requirements to receive import licenses.

The results highlight a possible limitation in the use of taxpayer services to drive compliance, in the absence of a robust enforcement framework. One implication of the finding is that tax administration and tax policy reforms must to be balanced in its focus on enforcement and the 'softer approach' in order to improve compliance among large taxpayers. The results also point to scope for the use of external enforcement mechanisms to substitute for expensive tax administration interventions such as service provision.

The remainder of this paper is as follows. Section 2 gives the background. Section 3 outlines a simple theoretical framework. Sections 4 and 5 present the data and the empirical framework. Section 6 discusses the results and Section 7 concludes.

2. Background

2.1 The Corporate Income Tax and The General Consumption Tax

The CIT rate for tax years 2009 – 2012 was 33.33 percent and applied to firms' reported profits. The GCT is a value added tax (VAT) and was applied at standard rates of 16.5 and 17.5

percent over the sample period.[3] The CIT and GCT are huge contributors to the overall tax revenue, accounting for about 11 and 17 percent to total tax collections respectively.[4] Jamaica's tax administration machinery has long been criticized as weak and inefficient. An obvious consequence of this is low tax compliance. In 2011 filing and payment compliance for the CIT – measured as whether the taxpayer filed and paid on time – were 40 and 53 percent respectively. In the same year, for the GCT, 83 percent of taxpayers filed on time and 88 percent paid on time.

One likely explanation for the sizeable difference in compliance rates for the CIT relative to the GCT is the stronger legal enforcement framework of the latter. The penalty structure across the two taxes present an interesting contrast. Failure to file CIT on time attracts a fine of just J$5000 (US$57). Interest of 40 percent per annum is charged against outstanding CIT liability. On the other hand, failure to file GCT on time attracts a fine of J$2000 (US$23) or 15 percent of the tax due and payable, whichever is larger. Interest of 2.5 percent compounded monthly is charged against the sum of outstanding GCT liabilities, penalties and surcharges. For large taxpayers, this structure implies higher penalties and interest for delinquents under the GCT relative to the CIT, with the difference between the two increasing in the amount of unpaid tax liabilities as shown in Figure A.1 in the Appendix. One obvious implication of this is that (larger) taxpayers have a clear incentive to be more compliant with the GCT than the CIT. The compliance patterns presented in Figure A.2 in the Appendix confirms this. Panel A shows much lower rates of late filing and payment for the GCT relative to the CIT. Panel B shows larger amounts of CIT paid on time but a larger share of reported GCT paid on time. The compliance patterns across taxes appear to be driven largely by key features of the enforcement framework. Comparing the compliance effects

[3] From May 2005 – December 2009 the standard GCT rate was 16.5 percent. The standard GCT rate was temporarily increased to 17.5 percent in January 2010 before being lowered to 16.5 percent in June 2012.
[4] In this research we focus on the local and not the international component of GCT. GCT's total (local and international) contribution to tax collections averaged about 31 percent over the last six fiscal years.

of the LTO across the CIT and GCT provides an opportunity to examine the potential effect of taxpayer service provision in a weak and strong enforcement context respectively.

2.2 The Large Taxpayer Office

Like most developing countries, the tax regime in Jamaica is characterized by extremely high dependence on a few large taxpayers for revenue. In 2011 the top 1 percent of taxpayers accounted for 82 percent and 66 percent of reported CIT and GCT respectively.[5] This dependence exposes the government to an extremely high level of risk from non-compliance of few taxpayers, and provides impetus for the tax administration to boost compliance efforts in general, but particularly for large taxpayers. To manage this risk, TAJ established the LTO in April 2009. Taxpayers are assigned to the LTO if they meet any of three criteria. The first and principal criteria is if annual gross receipts are greater than or equal to J$500 million (US$5.7 million). Secondly, if the total annual taxes paid is greater than or equal to J$50 million.[6] Thirdly, if related to a primary LTO client through for example common ownership, a subsidiary or branch.

An important feature of the LTO is its central focus on service provision. Its stated mission is "*to promote voluntary compliance and enhance revenue collection by providing exemplary specialized service to the large taxpayer population through a team of highly motivated and results oriented professionals"*. At the core of the LTO operations are client relationship managers (CRM). These positions were specially created to channel specialized services to large taxpayers. Once selected to the LTO each taxpayer is assigned a CRM who will serve as the main point of contact with the tax administration. The CRM will introduce and provide or facilitate the provision

[5] We use reported taxes instead of actual tax payments because the payment data provided by TAJ does not adequately identify specific payment components and therefore potentially comingles principal tax payments with penalties and interest.
[6] In general taxpayers that pay at least $50 million in taxes are large and most likely will gross more than $500 million in sales / gross receipts annually.

of the range of services offered by the LTO. These services include but are not limited to, the provision of tax advice, processing of tax compliance certificates, stamping of documents, tax seminars and workshops, filing and payment reminders, filing and payment facilitation, registration and reconciliation of tax accounts.[7] Although some of these services are available to the general taxpayer population at the various tax offices or through the customer care center, we argue that there is a significant increase in the intensity and efficiency of service delivery for LTO taxpayers.[8] Moreover the 'one-on-one' between LTO clients and CRM guarantees more efficient and convenient service delivery.

3 Theory

The standard economic model of tax evasion is outlined by Allingham and Sandmo (1972) (AS) – an adaptation of Becker's (1968) economics of crime approach – and models individual's tax compliance behavior as a rational decision. Their model predicts that higher levels of evasion are associated with low detection probabilities and low pecuniary costs if caught. The theoretical predictions of the AS model however have been criticized as inadequate in explaining observed patterns of tax compliance across countries. Complementary theories of tax compliance attempt to overcome some of the shortcomings of the standard approach and posit that non-pecuniary or tax morale factors play an important role in explaining taxpayer behavior (Luttmer and Singhal, 2014).

Whereas the standard theory models taxpayer's reporting decisions, more recent work examine taxpayers payment decision conditional on income being declared or where tax liabilities

[7] CRM's also help to facilitate audits carried out by TAJ's auditors. Their main role here is to ensure that the audit process is smooth and not overly disruptive for the taxpayer's normal business operations.

[8] Interviews with CRM's from the LTO confirm that the level of services offered to LTO clients is superior to that available regularly through the tax offices and call centers. They also point out that there are clear benefits to the taxpayers from the one-on-one interaction with the CRM which are derived not only through access to services but also the development of good relations.

are established (Hallsworth et al. 2014; Truglia and Troiano, 2015), a question much more closely related to this research. We adopt a simple model of payment compliance advanced by Hallsworth et al. (2014). We assume a two period model where taxpayers earn income (Y_i^G) – drawn from an i.i.d. probability distribution $f\,(Y_i^G)$ – in period one and none in period two.[9] The taxpayer is required to pay taxes on reported income at some rate *(t)* and the tax liability is given by: [10]

$$T_i = t * \max[0, Y_i^G]$$

We take reported income Y_i^G as given, but the taxpayer must decide whether to pay taxes in period one (x=1) or period two (x=2). We model the taxpayer's payment decision as a function of the real interest rate, compliance costs and a moral or psychic costs from non-compliance, The payment decision is made to maximize after tax income (Y_i^N) based on the following:

$$Y_i^N = \begin{cases} Y_i^G - T_i - C_i \quad if\ \ x = 1\ and\ \ Y_i^G - T_i - C_i\ \geq 0 \\ Y_i^G + (1+r)T_i - M_i - \ (1+\alpha)T_i \quad if x = 2\ or\ Y_i^G - T_i - C_{\ i}\ \ < 0 \end{cases} \qquad (1)$$

From (1), taxpayer *(i)* faces compliance cost ($C_{\ i} > 0$) in the first period but not in the second. This is a simplifying but rationalize-able assumption. For example it is plausible that compliance costs in period one are higher simply because taxpayers have to expend considerably more effort to complete filing and payment by a stipulated deadline.[11] The compliance cost in

[9] We take reported income as given and our model focuses solely on the decision to pay conditional on reporting.
[10] The model assumes that the decisions to file and pay taxes are made simultaneously. TAJ confirms that taxpayers typically file and pay (at least some portion) taxes at the same time.
[11] Complexities in the tax law can impose huge compliance costs – in terms of time and money – as taxpayers struggle to accurately calculate their taxes in order to file and pay by the due date. The numerous requests for filing extensions received by the TAJ may be an in indication of the relatively large compliance costs incurred when trying to comply with the stipulated filing deadline. In the second period compliance costs are arguably lower since there is no longer an effective time deadline by which to comply in order to avoid penalties and tax preparers and own opportunity costs of preparing taxes are likely to be much lower. Further where the taxpayer is having difficulty calculating taxes the tax administration, through audit, can provide the taxpayer with the correct calculation of the tax liability in the second period.

period one is juxtaposed against the costs and benefits from delaying payment until period two. Delaying payment means that the taxpayer can benefit from interest earned (r) on taxes not paid in period one. However the taxpayer also faces a penalty of α, that is proportional to the amount of tax owed and which takes values [0, 1]. Lastly, we assume that non-compliance in period one is associated with a moral cost ($M_i > 0$) incurred in period two, and is induced by the provision of taxpayer services.

The taxpayer will pay in period one if the value of doing so exceeds that of delaying until period two. The payment decision is therefore captured by the following condition:

$$Y_i^G - T_i - C_i \; > \; Y_i^G + (1+r)T_i - M_i - \; (1+\alpha)T_i \qquad \ldots\ldots\ldots \; (2)$$

From equation (2), the compliance effects of the LTO come through several channels. The first is through lower compliance costs. If taxpayer services that clarify complex or ambiguous tax laws and that facilitate speedy and convenient filing and payment of taxes can significantly reduce compliance costs (pecuniary and non-pecuniary) in period one, taxpayers may be encouraged to pay on time. The second is through a behavioral channel. In addition to the services provided, closer interaction between the tax administration and taxpayers within a customer centric context can improve taxpayers' perception of the tax administration. This can increase the moral or psychic costs of delaying payment – crowd in tax morale – and induce higher levels of (voluntary) compliance (Feld and Frey, 2002). Notwithstanding the predictions of the theoretical model, the impact on compliance is an open empirical question.

4 Date and Empirical Strategy

4.1 Data

We use administrative tax return data for the CIT and the GCT for 2009-2012.[12] We restrict our baseline sample to taxpayers with reported gross receipts of between J$100 million (US$ 1.1 million) and J$1 billion (US$11.4 million) who reported positive tax liabilities. The resulting sample sizes are 2,432 for the CIT and 34,764 for the GCT. From tax returns we collect data on filing date, gross receipts and reported tax liabilities. From the payments data we collect information on the payment date and the amount paid. Using these data, we construct our outcome measures for filing and payment compliance. For filing compliance we examine two outcomes. The first is captured by a dichotomous variable set equal to 1 if a taxpayer filed late and 0 if filed on time.[13] The second is the number of days a return is late. Essentially these measures together capture filing compliance effects along an extensive margin – whether a taxpayer filed late or not; and an intensive margin – how late was the taxpayer in filing.

For payment compliance we examine two sets outcomes - in total four outcome variables. The first two capture the timeliness of payments and are measured the same way we measured filing compliance above. In the second set we examine two additional payment outcomes - the amount of taxes paid on time and the share of reported taxes paid on time. Because the payment data gives aggregate amounts received from taxpayers, we are unable to identify specific payment components, i.e. whether amounts paid are solely taxes or a combination of taxes and other charges

[12] We examine compliance responses for taxpayers (firms) that file and pay the "company income tax final return" on form ITO2. We do not consider corporate tax returns filed on forms ITO3 and ITO4 which are the designated forms for "unincorporated bodies other than life assurance companies" and "life assurance companies" respectively. For the GCT we focus on the standard GCT return and do not include the quick return or returns for special tourism activities.
[13] For the CIT taxpayers are required to file their final or annual return by March 15 following the year of assessment. If this date fell on a weekend, we record as late if the taxpayer filed after the first business day of the following week. This is consistent with the practice of the tax administration.

and penalties. By restricting the analysis to payments made on or before the due date – we are arguably better able to capture taxpayers 'real' compliance response since payments made after the due date with respect to a particular filing period are more likely to include amounts for penalties, interest and audit assessments. As such, the amount of taxes paid on time and the share of reported taxes paid on time are arguably better measures of taxpayers' response to the LTO in relation to their contemporaneous tax liabilities.

We identify LTO clients using the client listing provided by TAJ. Treatment is indicated using a dichotomous variable set equal to 1 if the taxpayer appears on the client list and 0 otherwise.[14] Other data on taxpayer characteristic such as age, number of employees and economic sector and other financial data are from the tax returns and the tax registry databases.[15] Tables 1(a) and 1(b) provide summary statistics for the data used for the CIT and GCT analysis respectively.

4.2 Empirical Analysis

The empirical strategy adopts a fuzzy regression discontinuity design (RDD) that exploits an exogenous jump in the intensity of taxpayer service delivery that occurs when a taxpayer reaches gross receipts of J $500 million (US$5.7 million) and is selected into the large taxpayer office (LTO). Despite being the primary criteria, as explained above, the gross receipts threshold is not the sole selection criteria. Together with the other criteria and the operationalization of the

[14] The client listing provided was for taxpayers in the LTO as at 2013. We were unable to get a list for each of the years 2009 – 2012 from TAJ and so we are not able to tell when a particular taxpayer came onto the register. The analysis therefore assumes taxpayers listed on the client register in 2013 were clients for each of the years used in the analyses. If the LTO was effective in encouraging compliance then this could potentially bias our estimates downward. We re-estimate the model using only those taxpayers listed as LTO parent companies as our treatment group since it is most likely that the larger parent companies would have been on the client listing since its inception. The results are qualitatively similar to the baseline, with slightly larger coefficients.

[15] Data on the age of the taxpayer are from the tax registry data base and related to when the firm was actually registered for the particular tax. The number of employees are matched from merged data with PAYE tax filings. These data are more complete for the CIT sample.

selection process, selection into the LTO is non-deterministic at the threshold. Rather the probability of being selected (treated) is represented by:

$$P[Ti = 1|\, S_i] \begin{cases} g_1(S_i)\ if\ S_i\ \geq\ S_0 \\ g_0(S_i)\ if\ S_i\ <\ S_0 \end{cases} where\ g_1(S_i) \neq\ g_0(S_i) \quad (3)$$

The running variable S_i and the probability of treatment are related as follows:

$$P[T_{i,t} = 1 \mid S_i] =\ g_0(S_i) + [g_I(S_i) -\ g_0(S_i)]D_i \quad (4)$$

Where $D_i = 1(S_i\ \geq\ S_0)$

Estimation of the local average treatment effect (LATE) in a fuzzy RDD can be modeled by a two stage (2SLS) approach as set out in the following model:

First Stage:

$$E\ [T_i = 1] = \alpha_0 +\ \alpha_1 D_{i,t} + \alpha_2 \int_{(} s_{i,t)} +\ \alpha_3 \int_{(} s_{i,t)} * D_i + \mu_{i,t} \quad (5)$$

Where $s_{i,t}$ is the gross receipts of taxpayer *i* at time *t*, centered at the threshold value.[16]

Second Stage:

$$Y_{i,t} = \beta_0 +\ \beta_1 \widehat{T_{i,t}}\ \ +\ \ \beta_3 \widehat{\int_{(} s_{i,t)}} * T_{i,t} + \beta_2 \int_{(} s_{i,t)} + \varepsilon_{i,t} \quad (6)$$

The first stage regression estimates the probability of treatment using the firm's location relative to the gross receipts threshold $D_{i,t}$ and the interaction with gross receipt (s) as instruments. $\int_{(} s_{i,t)}$ is a flexible polynomial function to account for possible nonlinearities in the relationship between the outcome variables and the running variable. Our baseline model adopts a linear

[16] We follow the literature and center gross receipts around the threshold level [s_i = (S_i – $500M)]. Centering ensures that the treatment effect at the threshold can be read from the coefficient on the treatment indicator in models that include interaction terms.

specification. The second stage uses the fitted values from the first stage to estimate the effects on the dependent variable $Y_{i,t}$ – which captures the various measures of tax compliance outlined above. In alternative specifications of the model we include key taxpayer characteristics as controls in $X_{i,t}$ and year dummies $\tau_t$to test for robustness. The LATE is given by β_1.

We first examine the validity of the RDD. Panels A and B in Figure 1 show regression discontinuity plots of the probability of treatment under the LTO for the CIT and GCT samples respectively. The plots fit local linear regressions on either side of the threshold with local sample averages of the outcome variable – in this case the probability of treatment, within bins of the running variable – in this case gross receipts (centered at J$500 million). Both figures show a discontinuous increase in treatment probability at the gross receipts threshold, suggesting the RDD is valid.

Another key identifying assumption of the RDD is that taxpayers are not able to perfectly manipulate reported gross receipts; either to locate below the threshold to avoid selection or above the threshold to invite selection. We argue that because the gross receipts threshold is not the sole factor used in assigning taxpayers – the others being whether a taxpayer is related to an LTO client and if total taxes paid is greater than or equal to J$50 million , then manipulation by underreporting of gross receipts become less viable. If taxpayers significantly manipulate reported gross receipts in order to avoid or invite treatment we expect to see bunching around the threshold. We test for structural breaks in the density of reported gross receipts by first examining simple histogram density plots for the CIT and GCT samples in Figure A.3 in the Appendix. More formally we adopt Mcrary (2008) density manipulation test for the respective samples presented in Figure A.4. Both tests show no evidence of bunching or manipulation of the running variable.

In other tests we examine the existence of discontinuities at other plausible points along the gross receipts distribution – 'placebo thresholds', based on TAJ's segmentation of the taxpayer population. Figure A.5 in the Appendix present the results for test for discontinuities at placebo thresholds at J$100 million (US$1.1 million) and J$1 billion (US$ 11.4 million). The RD plots indicate that treatment probability does not exhibit a discontinuity at either of the placebo thresholds. Further tests of the credibility of the RDD examine the transition of other covariates across the gross receipts threshold. This is to assuage concerns that other factors might also be changing discontinuously around the threshold that could impact the compliance outcomes we examine. Figures A.6 and A.7 in the Appendix present results from RD plots of key taxpayer characteristics for the CIT and GCT samples respectively. In general the plots show taxpayer characteristics transitioning smoothly across the threshold, except for an indicator for taxpayers in the financial sector. Only a relatively small proportion of the samples – 5 percent for the CIT and 7 percent for the GCT operate in the financial sector and should not significantly affect the results.[17]

5 Results

5.1 Filing and Payment Compliance for the CIT and GCT

Filing Compliance for the CIT

RD plots presented in Figure 2 show reductions in both the probability of filing late and the number of days late that CIT returns are filed. Table 2 present estimates of the LATE from 2SLS regressions, using data within ranges of gross receipts that correspond with the optimal

[17] The confidence interval on the RD estimates for the financial sector indicator outcome is large, suggesting that the discontinuity observed is not statistically significant. In any case we run separate estimates for the effects on the respective compliance outcomes for financial and non-financial sector taxpayers to test for potential bias. For both the CIT and GCT sample, the results are similar to the baseline model.

bandwidth proposed by Imbens and Kalyanaraman (2009) (IK).[18] Panel A shows a reduction in the probability of late filing by about 90 percentage points (Column 1) and Panel B shows a reduction in the number of days late that returns are filed by 190 days (column 1). However the effects are imprecisely estimated and in both cases are statistically insignificant. These results are robust to the inclusion of covariates and alternative bandwidth choices.[19]

Payment Compliance for the CIT

We examine CIT payment compliance outcomes for tax years 2009 to 2011.[20] RD plots in Figure 3 shows a reduction in the probability of late payment but no effect for the number of days late that CIT is paid. LATE presented in Table 3 show these effects to be statistically insignificant. Figure 4 presents RD plots for the amount of CIT paid on time and the share of CIT paid on time; and shows a discontinuous increase in both outcomes at the gross receipts threshold. The directional effects from the RD plots are again re-enforced by the LATE estimates in Table 4, but as in the outcomes examined above, are statistically insignificant. The null effects hold for alternative bandwidth choices and model specifications. Interestingly the point estimates from 2SLS are large and may suggest significant economic gains in compliance associated with the LTO. However the lack of statistical significance does not allow for any clear determination of the effects of the LTO on CIT compliance outcomes examined.

[18] Baseline results from 2SLS regressions using the optimal IK bandwidth are reported for all compliance outcomes examined. Results for alternative bandwidths (half and twice the optimal bandwidth) are presented in the results tables for the respective outcomes as robustness checks.

[19] We also examine the filing response for a larger sample of taxpayers, which include all taxpayers with gross receipts between J$100 million and J$1 billion who filed a tax return for the period of analysis, and therefore includes those that reported zero tax liabilities. The results in panel A of Table A.1 are for the CIT and indicate no significant effects on filing compliance. Similar results are presented for the GCT in Panel B.

[20] CIT payments data for tax year 2012 were not available.

Filing Compliance for the GCT

Figure 5 presents RD plots of the effect of the LTO on filing compliance outcomes for the GCT. The figure shows a discontinuous drop in both the probability that taxpayers file late and the number of days late that GCT returns are filed. Table 5 presents estimates of the LATE for both filing compliance outcomes. The results in Panel A indicate a 22 percentage point reduction (column 1) in the probability of late filing. Results are robust to the inclusion of controls and for larger but not smaller bandwidth choices. The results in Panel B also suggests that taxpayers reduce the number of days late they file GCT returns by 14 days (column 1). Results are robust to the inclusion of controls and for larger but not smaller bandwidth choices. In general the results suggest that taxpayers respond along both the extensive margin – whether GCT returns are filed on time or not, and the intensive margin – how late GCT returns are filed.

Payment Compliance for the GCT

Results for the timeliness of GCT payments are presented in Figure 6 and show a discontinuous drop in both the probability that taxpayers pay GCT late and the number of days late that GCT is paid. LATE presented in Table 6 in Panel A (column 1) indicates a 17 percentage point reduction in the probability of late payment for the GCT. Similar to filing probability, results are robust to the inclusion of controls and larger, but not smaller bandwidths. The results in Panel B (column 1) suggest that taxpayers reduce the number of days late they pay GCT by 247 days. Results are robust to the inclusion of controls and alternative bandwidths. Taxpayer's 'money response' is captured in Figure 7, and shows an increase in both the amount of GCT paid on time and the share of reported GCT paid on time at the gross receipts threshold. 2SLS estimates of the LATE presented in Table 7 confirm these results. The results in Panel A (column 1) show an increase in the amount of GCT paid on time by about J$4 million and is robust to the inclusion of

controls and alternative bandwidths. For the share of reported GCT paid on time, in Panel B, we find an increase of about 27 percent (column 1). Though robust to the inclusion of controls, this result is no longer statistically significant at alternative bandwidths examined.

In general, a contrast of the results for the CIT and GCT can offer insight into the potential for non-pecuniary factors more generally and taxpayer services is particular, to influence tax compliance in weak and stronger enforcement contexts. The null effects for the CIT and the positive compliance effects for the GCT provide suggestive evidence of a complementarity in the relationship between the strength of the legal enforcement framework of the taxing regime and the provision of taxpayer service. To strengthen the case for comparability of compliance outcomes across the two tax types, we address possible confounding coming from heterogeneity in taxpayers that file CIT and GCT – a sample selection problem, by restricting the analysis to only taxpayers who file both. We present results on filing and payment responses for this subsample in Table A.2 in the Appendix. The results are qualitatively similar to the baseline results using the optimal IK bandwidths – suggesting that the same taxpayer responds more positively to the provision of services for the GCT – which has the stronger enforcement.

Comparability of the compliance outcomes may still be confounded by important differences in the structure of the taxes themselves. However we argue that the margin of response examined – timeliness of filing and payment conditional on reporting – are more comparably relative to other compliance outcomes typically studied such as reporting behavior. Sill it can be argued, for example, that complexities of the CIT are more likely to cause delays in filing and payment compared to the GCT. But we show in Figure A.1 that the compliance patterns for measures of the timeliness of filing and payments hold for the share of reported taxes paid on time. This suggests that even taxpayers who file and pay on time are still more compliant with the GCT

– pay a larger share of reported tax liability. This reinforces our argument that the observed compliance behavior across taxes are likely driven primarily by differences in the enforcement context, and mitigates concerns about confounding from sample selection and heterogeneity across taxes.

5.2 Heterogeneous Effects

Next we test for heterogeneous effects for GCT compliance. We focus on the GCT since the lax enforcement framework of the CIT will tend to nullify the potentially positive compliance effects of the LTO.[21] The compliance effects of the LTO can be very different across economic sectors for a number of reasons.[22] Differences in the business and regulatory environment across economic sectors that impose varied compliance requirements on firms can differentially affect taxpayer's compliance behavior. For example firms in the financial sector that are already relatively heavily regulated to ensure they are 'fit and proper', may not be significantly impacted by the services provided through the LTO, compared to non-financial firms. A similar argument can be made for importing versus non-importing taxpayers, where the former require a tax compliance certification (TCC) in order to carry out its core business.[23] We examine differences in the compliance response across financial and non-financial sector taxpayers as well as importing and non-importing taxpayers.

Table 8 summarizes results for filing and payment compliance outcomes for financial and non-financial sector taxpayers. The results for financial sector taxpayers are reported in Panel A and indicate insignificant effects for all filing and payment compliance outcomes examined. The

[21] Test for heterogeneity in compliance response for the CIT data yielded null results for all compliance outcomes.
[22] Studies that examine reporting behavior for the VAT for example point out that firms that sell directly to end users or consumers may be more likely to evade than firms who sell to other firms (Almunia & Rodriguez 2014; Pomeranz, 2013).
[23] We loosely define importers as taxpayers for whom imports account for at least 20 percent of total supplies.

opposite is true for non-financial sector taxpayers, reported in Panel B, where we find significant improvements in all compliance outcomes examined. We find significant reductions in the probability of filing late (-0.17); the number of days late that GCT returns are filed (-15 days) the probability of paying late (-0.145); and the number of days late that GCT is paid (-258 days). We also find significant gains in the amount of GCT paid on time (J$2.4 million) and the share of reported GCT paid on time (16 percent). Comparing importing and non-importing taxpayers, we a find a similar dynamic. The results presented in Table 9 suggest that the compliance behavior of importers is not significantly impacted by the LTO, but for non-importers there are significant improvements in all the compliance outcomes examined. Estimates of the LATE for non-importers are qualitatively similar to that of non-financial taxpayers presented in Table 8. These results suggest that compliance mechanisms – external to the tax administration, example using regulatory and other oversight bodies to ensure compliance or requiring TCC's to conduct certain business activities, are viable options to boost compliance.[24] In the context of this research, these external compliance mechanism appear to act as substitutes for the provision of taxpayer services.

6 Conclusion

This essay examined the effect taxpayer service delivery through the LTO, on filing and payment of CIT and GCT for large taxpayers in Jamaica. We find generally positive compliance effects on filing and payment for the GCT but no effect for the CIT. A contrast of the results provides suggestive evidence of a complementarity in the relationship between the strength of the legal enforcement framework and the provision of taxpayer services. We argue that the relatively lax legal enforcement framework of the CIT moderates the potentially positive compliance effects

[24] The results presented in Tables 8 and 9 are from regressions using the optimal bandwidth (IK) only. The results are generally robust to adjustment in the bandwidth and the inclusion of controls.

of service provided through of the LTO. On the other hand, the stronger legal enforcement framework of the GCT complements the provision taxpayer services resulting in significant improvements in filing and payment. The null effects for the CIT raises doubts about the ability of tax morale factors and taxpayer services more specifically, by themselves, to significantly improve filing and payment compliance in developing countries. We also examined heterogeneous effects for key economic sectors and activities, and find improvements in filing and payment compliance for the GCT for taxpayers in the non-financial sector and for non-importers, but null effects for financial sector taxpayers and importers. Strict regulations of financial sector firms and TCC requirements for importers appear to be driving these results, and highlights the substitutability between external compliance mechanisms and the provision of taxpayer services.

The results have important implications for tax policy and tax administration in developing countries. The first points to limitations in the adoption of a softer approach to tax administration that attempts to encourage tax compliance by leveraging tax moral factors in a context of major enforcement deficiencies - example weak legal framework and corruption. Our results suggest that a strong(er) legal enforcement framework is required if non-pecuniary factors such as taxpayer service provision is to be effective in improving compliance. In the context of Jamaica, strengthening of the income tax law to remove or significantly limit opportunities for taxpayers to delay filing and payment of taxes could make the services provided by the LTO more valuable and could translate to improvements in compliance. Secondly, alternative compliance features, for example the use of strong regulatory or oversight sight bodies to ensure tax compliance of constituents; and requiring TCC's to conduct key business activities, are important drivers of tax compliance and can potentially serve as substitutes for other enforcement and non-pecuniary tax

compliance programs carried on by the TAJ. Utilizing these ‘compliance agents’ could provide a low cost solution to the already resource strapped tax administration in many developing countries.

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Tables

Table 1A: Summary Statistics for the CIT

Variable	Observations	Mean	Std. Dev.
LTO (Treatment)	2,432	0.17	0.37
Gross receipts annual (J$ Millions)	2,432	307.00	209.00
Filed late	2,394	0.37	0.48
No. days filed late	2,394	38.59	96.79
Paid late	1,800	0.54	0.50
No. days paid late	1,800	289.21	468.69
CIT Paid (J$ millions)	1,800	3.57	13.90
Share CIT paid on time	1,800	0.45	0.53
Estimated CIT Paid (J$ millions)	2,432	2.76	11.00
CIT Reported (J$ millions)	2,432	3.26	8.26
Financial Sector	2,432	0.05	0.21
Number of Employees	2,124	48.34	90.51
Age	2,432	10.55	4.40

Notes: Tax return data are for taxpayers with reported gross receipts between J$100 million and J$1 billion who report positive tax liabilities for tax years 2009 – 2012. Payments data are for tax years 2009 – 2011 as data for 2012 were unavailable.

Table 1B: Summary Statistics for the GCT

Variable	Obs	Mean	Std. Dev.
LTO (Treatment)	34,764	0.22	0.42
Gross receipts annual (J$ Millons)	34,764	296	203
Filed late	34,739	0.06	0.23
No. days filed late	34,739	3.76	35.32
Paid late	34,764	0.10	0.30
No. days paid late	34,764	78.73	349.59
GCT Paid (J$ Millions)	34,764	1.22588	2.73232
Share GCT paid on time	34,762	0.90	0.74
Tax Arrears (J$ millions)	34,734	-0.009	0.775
Financial Sector	34,764	0.07	0.26
Age	33,951	8.72	1.98

Notes: Tax return data are for taxpayers with reported gross receipts between J$100 million and J$1 billion who report positive tax liabilities between May 2009 and December 31, 2012. The start date suggests that we capture data roughly two months after the establishment of the LTO in April 2009.

Table 2: Effect of the LTO on Timely Filing of the CIT

	Filing Compliance					
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A - Probability of Filing Late						
LTO	-0.904	-0.315	-0.524	-0.419	-0.623	0.851
	(1.241)	(0.835)	(0.334)	(0.322)	(3.264)	(1.641)
Bandwidth (J$ Millions)	241	241	481	481	120	120
Observations	938	837	2,388	2,087	401	357
Year Dummies	no	yes	no	yes	no	yes
Controls	no	yes	no	yes	no	yes
Panel B - Number of Days Filed Late						
LTO	-190.2	-125.7	-72.98	-68.31	-154.6	74.95
	(188.1)	(137.0)	(56.55)	(51.89)	(567.4)	(340.1)
Bandwidth (J$ Millions)	286	286	572	572	143	143
Observations	1,179	1,063	2,394	2,092	480	429
Year Dummies	no	yes	no	yes	no	yes
Controls	no	yes	no	yes	no	yes

Note: This table presents estimates for filing compliance for the CIT. The dependent variable in Panel A is an indicator equal 1 if the taxpayer filed late and 0 otherwise. The dependent variable in Panel B captures the number of days after the due date that taxpayers file a CIT return. The results presented in columns 1-2 are for the optimal bandwidth as proposed by Imbens and Kalyanaraman (2009), with and without controls respectively. Columns 3-4 present results for a larger bandwidth (2 x IK) and columns 5-6 for a smaller bandwidth (1/2 x IK). Controls include the 'age' of the taxpayer, the amount of estimated CIT paid, reported CIT and a dummy that capture whether or not the taxpayer operates in the financial sector. Regressions adopt a linear specification. Robust standard errors in parentheses.*p<0.10, **p<0.05, ***p<0.01.

Table 3: Effect of the LTO on Timely Payment of the CIT

	Payment Compliance (Timeliness)					
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A - Probability of Paying Late						
LTO	-0.805	-0.704	-0.387	-0.386	-2.462	-0.0777
	(0.891)	(0.767)	(0.326)	(0.323)	(9.745)	(1.376)
Bandwidth (J$ Millions)	289	289	578	578	144	144
Observations	874	797	1,800	1,609	358	322
Year Dummies	no	yes	no	yes	no	yes
Controls	no	yes	no	yes	no	yes
Panel B - Number of Days Paid Late						
LTO	-77.79	-127.3	-17.27	-18.71	-1,049	-880.4
	(305.7)	(282.1)	(245.9)	(234.7)	(1,303)	(992.2)
Bandwidth (J$ Millions)	477	477	947	947	237	237
Observations	1,793	1,603	1,800	1,609	668	601
Year Dummies	no	yes	no	yes	no	yes
Controls	no	yes	no	yes	no	yes

Note: This table presents estimates for payment compliance – timeliness of payments, for the CIT. The dependent variable in Panel A is an indicator equal 1 if the taxpayer paid late and 0 otherwise. The dependent variable in Panel B captures the number of days after the due date that the taxpayer paid CIT. The results presented in columns 1-2 are for the optimal bandwidth proposed by Imbens and Kalyanaraman (2009), with and without controls respectively. Columns 3-4 present results for a larger bandwidth (2 x IK) and columns 5-6 for a smaller bandwidth (1/2 x IK). Controls include the 'age' of the taxpayer, the amount of estimated CIT paid, reported CIT and a dummy that capture whether or not the taxpayer operates in the financial sector. Regressions adopt a linear specification. Robust standard errors in parentheses.*p<0.10, **p<0.05, ***p<0.01.

Table 4: Effect of the LTO on the Amount of CIT Paid on Time

	Payment Compliance (Amount Paid)					
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A - Amount Paid on Time						
LTO	9.236	4.633	9.183	4.183	33.40	6.859
	(13.97)	(5.272)	(11.65)	(4.816)	(40.82)	(11.83)
Bandwidth (J$ Millions)	562	562	1125	1125	281	281
Observations	1,733	1,553	1,733	1,553	817	744
Year Dummies	no	yes	no	yes	no	yes
Controls	no	yes	no	yes	no	yes
Panel B - Share of Reported CIT Paid on Time						
LTO	1.007	0.621	0.608	0.543	0.845	1.018
	(0.870)	(0.438)	(0.413)	(0.384)	(2.887)	(1.000)
Bandwidth (J$ Millions)	336	336	674	674	168	168
Observations	1,064	1,609	1,609	1,609	398	769
Year Dummy	no	yes	no	yes	no	yes
Controls	no	yes	no	yes	no	yes

Note: This table presents estimates for payment compliance – amounts paid, for the CIT. The dependent variable in Panel A is the amount of CIT paid on time (in millions J$). The dependent variable in Panel B captures the share of reported CIT paid on time. The results presented in columns 1-2 are for the optimal bandwidth as proposed by Imbens and Kalyanaraman (2009), with and without controls respectively. Columns 3-4 present results for a larger bandwidth (2 x IK) and columns 5-6 for a smaller bandwidth (1/2 x IK). Controls include the 'age' of the taxpayer, the amount of estimated CIT paid, reported CIT and a dummy that capture whether or not the taxpayer operates in the financial sector. Regressions adopt a linear specification. Robust standard errors in parentheses.*p<0.10, **p<0.05, ***p<0.01.

Table 5: Effect of the LTO on Timely Filing of the GCT

	Filing Compliance					
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A - Probability of Filing Late						
LTO	-0.222**	-0.195**	-0.153***	-0.148***	0.0146	0.0367
	(0.0883)	(0.0822)	(0.0476)	(0.0467)	(0.0781)	(0.0723)
Bandwidth (J$ Millions)	125	125	250	250	62.5	62.5
Observations	6,026	5,849	13,766	13,380	3,024	2,943
Year-Month Dummies	no	yes	no	yes	no	yes
Controls	no	yes	no	yes	no	yes
Panel B - Number of Days Late						
LTO	-14.44**	-15.02***	-10.21***	-10.26***	-13.39***	-13.61**
	(5.629)	(5.654)	(3.595)	(3.602)	(5.117)	(5.333)
Bandwidth (J$ Millions)	235	235	470	470	118	118
Observations	12,790	12,433	34,571	33,732	5,662	5,491
Year-Month Dummies	no	yes	no	yes	no	yes
Controls	no	yes	no	yes	no	yes

Notes: This table presents estimates for filing compliance for the GCT. The dependent variable in Panel A is an indicator equal 1 if the taxpayer filed late and 0 otherwise. The dependent variable in Panel B captures the number of days after the due date that taxpayers file a GCT return. The results presented in columns 1-2 are for the optimal bandwidth as proposed by Imbens and Kalyanaraman (2009), with and without controls respectively. Columns 3-4 present results for a larger bandwidth (2 x IK) and columns 5-6 for a smaller bandwidth (1/2 x IK). Controls include the 'age' of the taxpayer, amount of GCT arrears / credits and a dummy that capture whether or not the taxpayer operates in the financial sector. Regressions adopt a linear specification. Robust standard errors in parentheses.*p<0.10, **p<0.05, ***p<0.01.

Table 6: Effect of the LTO on Timely Payment of the GCT

	Payment Compliance (Timeliness)					
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A - Probability of Paying Late						
LTO	-0.174*	-0.150*	-0.168***	-0.174***	-0.0162	0.0401
	(0.0893)	(0.0826)	(0.0509)	(0.0510)	(0.111)	(0.109)
Bandwidth (J$ Millions)	156	156	312	312	78	78
Observations	7,691	7,475	19,141	18,616	3,764	3,658
Year-Month Dummies	no	yes	no	yes	no	yes
Controls	no	yes	no	yes	no	yes
Panel B - Number of Days Late						
LTO	-247.0***	-229.4***	-189.3***	-174.1***	-315.9***	-260.8***
	(49.23)	(48.79)	(33.11)	(34.86)	(96.30)	(85.35)
Bandwidth (J$ Millions)	361	361	722	722	181	181
Observations	25,693	25,040	34,764	33,921	8,801	8,559
Year-Month Dummies	no	yes	no	yes	no	yes
Controls	no	yes	no	yes	no	yes

Note: This table presents estimates for payment compliance – timeliness of payments, for the GCT. The dependent variable in Panel A is an indicator equal 1 if the taxpayer paid late and 0 otherwise. The dependent variable in Panel B captures the number of days after the due date that the taxpayer paid CIT. The results presented in columns 1-2 are for the optimal bandwidth as proposed by Imbens and Kalyanaraman (2009), with and without controls respectively. Columns 3-4 present results for a larger bandwidth (2 x IK) and columns 5-6 for a smaller bandwidth (1/2 x IK). Controls include the 'age' of the taxpayer, amount of GCT arrears / credits and a dummy that capture whether or not the taxpayer operates in the financial sector. Regressions adopt a linear specification. Robust standard errors in parentheses.*p<0.10, **p<0.05, ***p<0.01.

Table 7: Effect of the LTO on the Amount of GCT Paid on Time

	Payment Compliance (Amount Paid)					
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A - Amount of GCT Paid on Time						
LTO	4.415***	3.540***	1.842***	1.536***	7.304***	6.162***
	(0.830)	(0.696)	(0.391)	(0.378)	(1.981)	(1.717)
Bandwidth (J$ Millions)	207	207	414	414	104	104
Observations	10350	10,061	34212	33,385	4878	4,730
Year-Month Dummies	no	yes	no	yes	no	yes
Controls	no	yes	no	yes	no	yes
Panel B - Share of Reported GCT Paid on Time						
LTO	0.266**	0.193*	0.0854	0.0695	-0.0795	-0.143
	(0.131)	(0.106)	(0.105)	(0.124)	(0.132)	(0.135)
Bandwidth (J$ Millions)	166	166	332	332	83	83
Observations	8,081	7,852	21,493	20,916	4,014	3,898
Year-Month Dummies	no	yes	no	yes	no	yes
Controls	no	yes	no	yes	no	yes

Notes: This table presents estimates for payment compliance – amounts paid, for the GCT. The dependent variable in Panel A is the amount of GCT paid on time (in millions J$). The dependent variable in Panel B captures the share of reported GCT paid on time. The results presented in columns 1-2 are for the optimal bandwidth as proposed by Imbens and Kalyanaraman (2009), with and without controls respectively. Columns 3-4 present results for a larger bandwidth (2 x IK) and columns 5-6 for a smaller bandwidth (1/2 x IK). Controls include the 'age' of the taxpayer, amount of GCT arrears / credits and a dummy that capture whether or not the taxpayer operates in the financial sector. Regressions adopt a linear specification. Robust standard errors in parentheses.*p<0.10, **p<0.05, ***p<0.01.

Table 8: GCT Filing and Payment Compliance for Financial and Non-Financial Sector

	Filed Late (1)	Days File Late (2)	Paid Late (3)	Days Paid Late (4)	Amount Paid OT (5)	Share Paid OT (6)
Financial Sector Taxpayers						
LTO	0.0699	42.06	0.0761	-136.8	-53.57	-1.100
	(0.0670)	(122.8)	(0.105)	(200.3)	(61.00)	(1.047)
Observations	712	1,176	814	1,888	1,014	835
Year Dummy	no	no	no	no	no	no
Controls	no	no	no	no	no	no
Non Finacial Taxpayers						
LTO	-0.172**	-15.34***	-0.145*	-258.1***	2.398***	0.157*
	(0.0694)	(5.748)	(0.0758)	(51.48)	(0.545)	(0.0908)
Observations	5,314	11,614	6,877	23,805	9336	7,246
Year Dummy	no	no	no	no	no	no
Controls	no	no	no	no	no	no
Bandwidth (J$ Millions)	125	235	156	361	207	166

Notes: This table presents estimates of filing and payment compliance for 'financial' and 'non-financial' sector taxpayers. Taxpayers are linked to the financial and non-financial sectors using industry codes from the tax returns. All results presented are for the optimal bandwidth proposed by Imbens and Kalyanaraman (2009). Regressions adopt a linear specification. Robust standard errors in parentheses.*p<0.10, **p<0.05, ***p<0.01.

Table 9: GCT Filing and Payment Compliance for Importers and Non-Importers

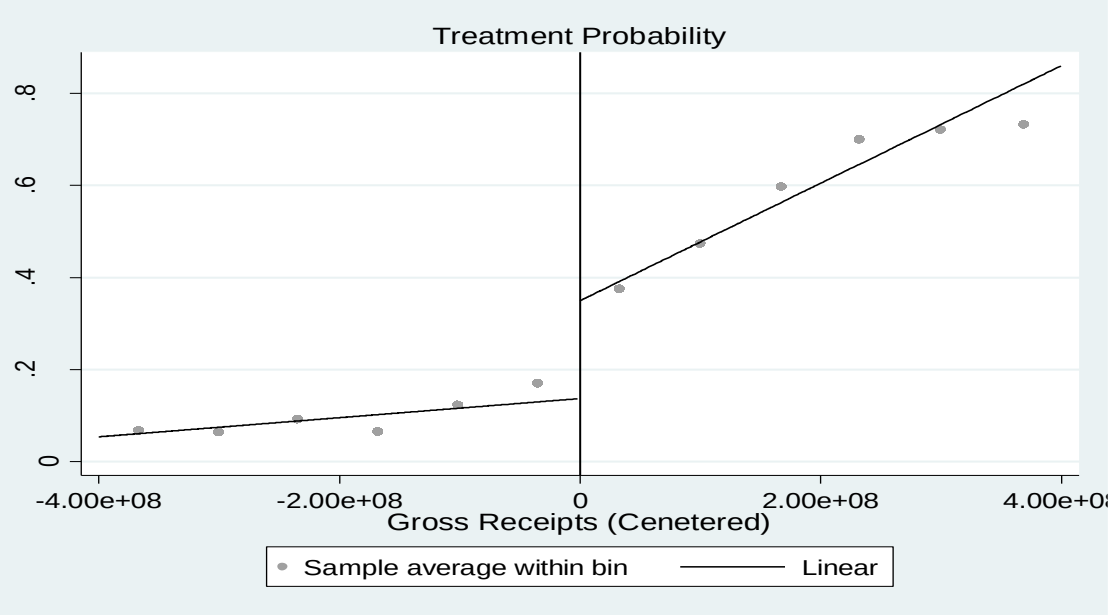
	Filed Late (1)	Days File Late (2)	Paid Late (3)	Days Paid Late (4)	Amount Paid OT (5)	Share Paid OT (6)
Importers						
LTO	-0.227	-0.732	-0.102	106.4	3.897	-1.730
	(0.790)	(1.535)	(0.600)	(99.82)	(4.629)	(4.162)
Observations	1,049	2,250	1,341	4,143	1,799	1,408
Year Dummy	no	no	no	no	no	no
Controls	no	no	no	no	no	no
Non-Importers						
LTO	-0.228**	-14.50**	-0.208***	-274.7***	4.343***	0.312**
	(0.0900)	(5.775)	(0.0718)	(52.14)	(0.806)	(0.134)
Observations	4,977	10,540	6,347	21,550	8,551	6,673
Year Dummy	no	no	no	no	no	no
Controls	no	no	no	no	no	no
Bandwidth (J$ Millions)	125	235	156	361	207	166

Notes: This table presents estimates of filing and payment compliance for 'importers' and 'non-importers'. We classify taxpayers as importers if their import / output ratio is greater than or equal to 20 percent receipts and taxpayer with a ratio less than 20 percent as non-importers. All results presented are for the optimal bandwidth proposed by Imbens and Kalyanaraman (2009). Regressions adopt a linear specification. Robust standard errors in parentheses.*p<0.10, **p<0.05, ***p<0.01.

Figures

Figure 1

Panel (a): Discontinuity in Treatment Probability for the CIT (First Stage)



Panel (b): Discontinuity in Treatment Probability for the GCT (First Stage)

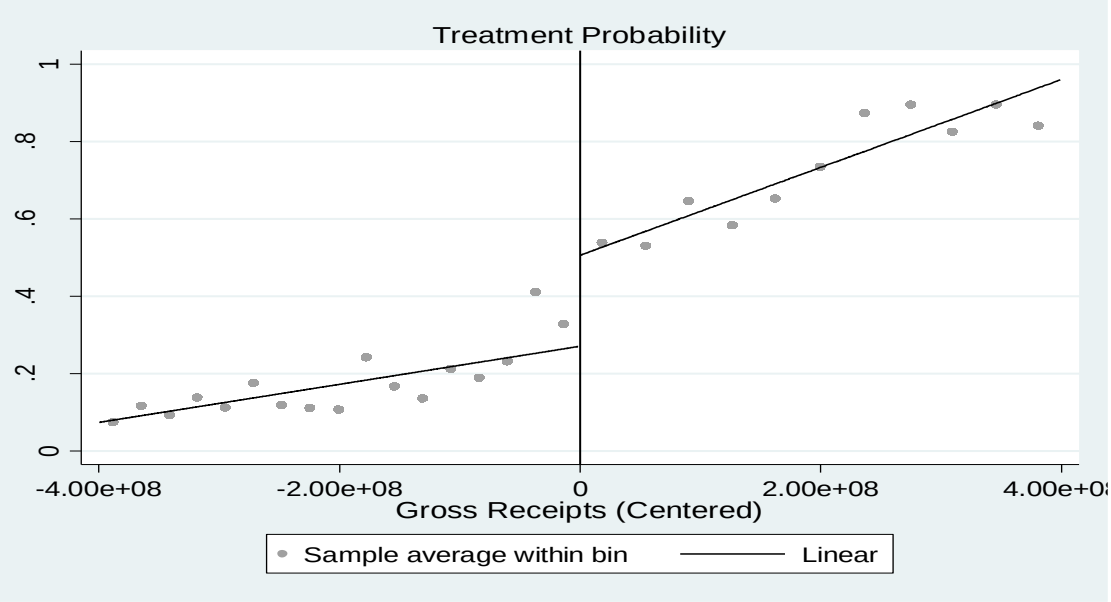
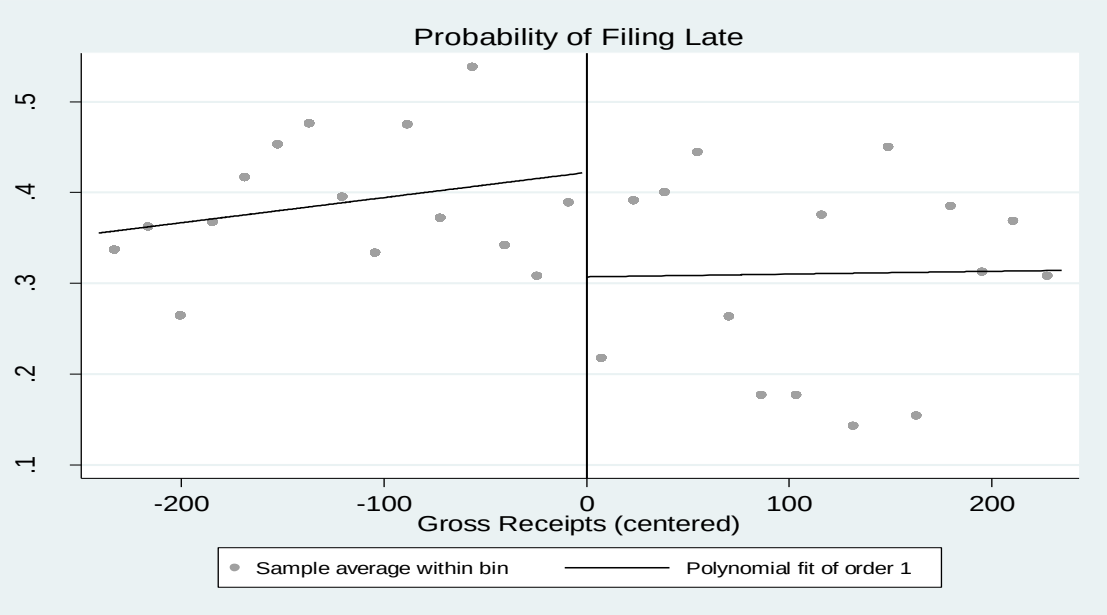
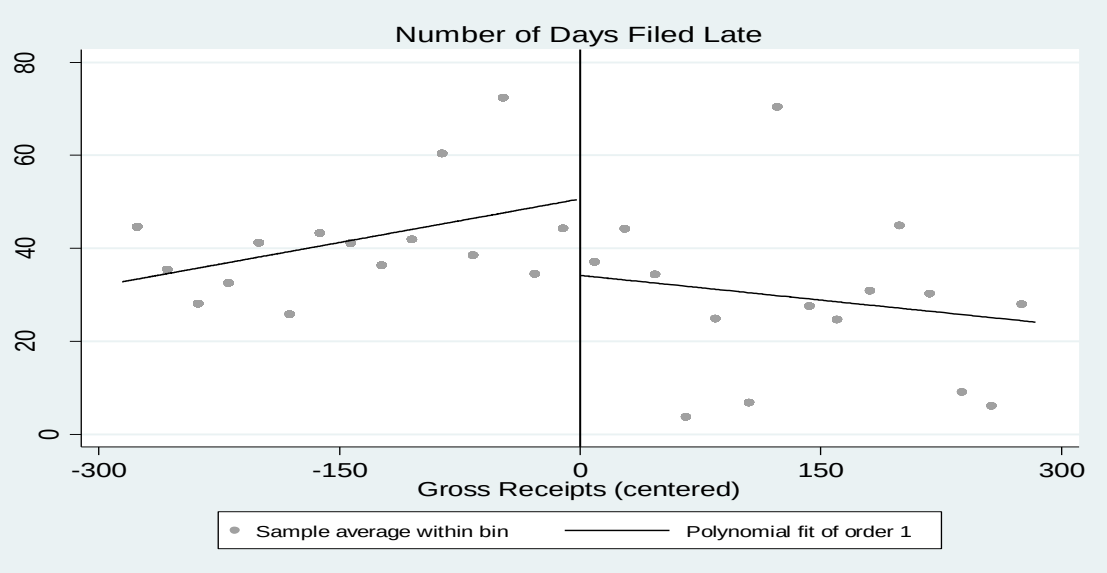


Figure 2

Panel A: Probability CIT Returns are Filed Late



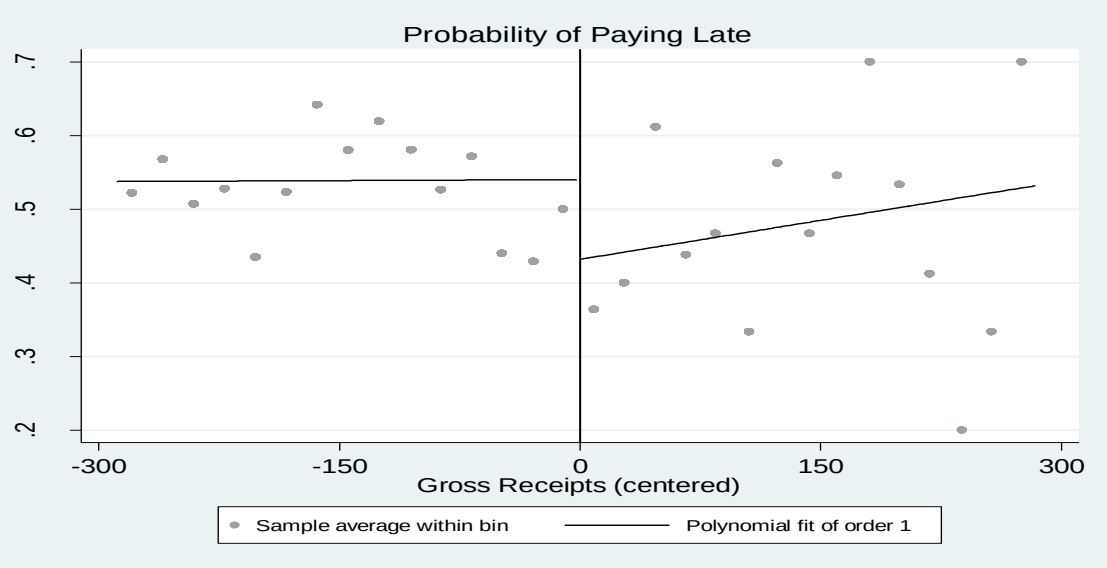
Panel B: Number of Days Filed Late CIT is Filed



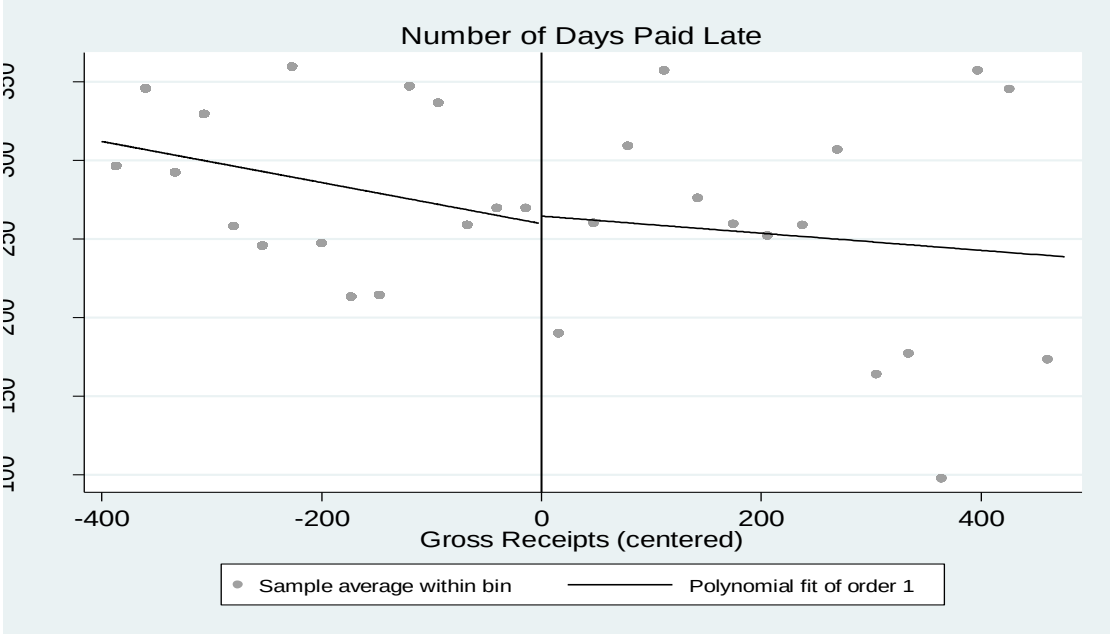
Notes: Bandwidths are chosen to approximate the optimal (IK) bandwidth for the respective outcomes. RD Plots done using IMSE – evenly spaced (ES) method with spacing estimators proposed by Calonico et al. (2014b). The approach fits linear regressions that approximate the conditional mean of the outcome variables to the left and right of the cut off.

Figure 3

Panel A: Probability that CIT is Paid Late



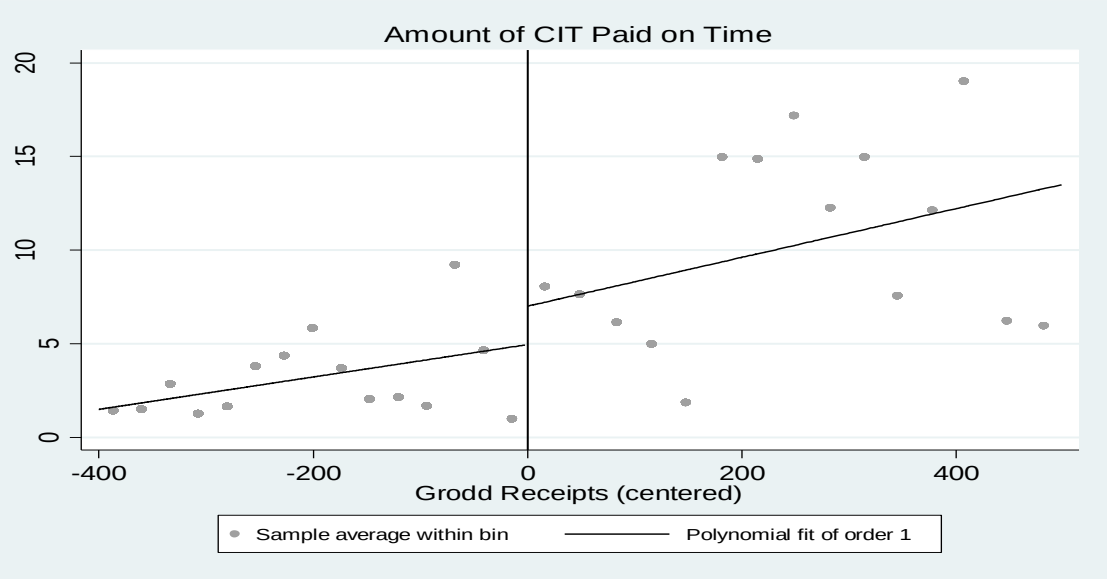
Panel B: Number of Days Late CIT is Paid



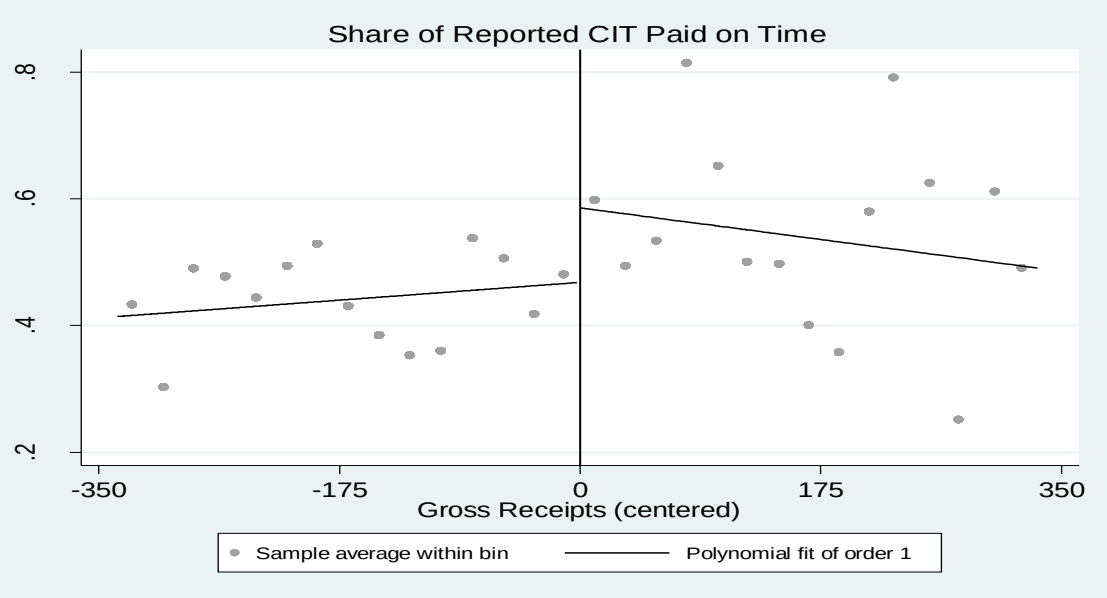
Notes: Bandwidths are chosen to approximate the optimal (IK) bandwidth for the respective outcomes. RD Plots done using the default IMSE – evenly spaced (ES) method with spacing estimators Calonico et al. (2014b). The approach fits linear regression curves that approximate the conditional means of the outcome variable to the left and right of the cut off.

Figure 4

Panel A: Amount of CIT Paid on Time



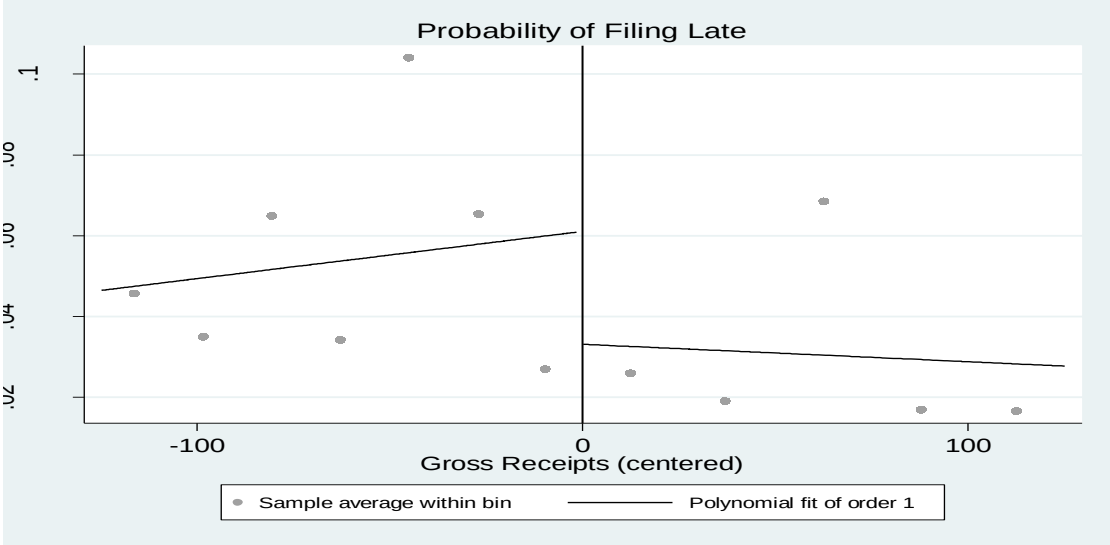
Panel B: Share of Reported CIT Paid on Time



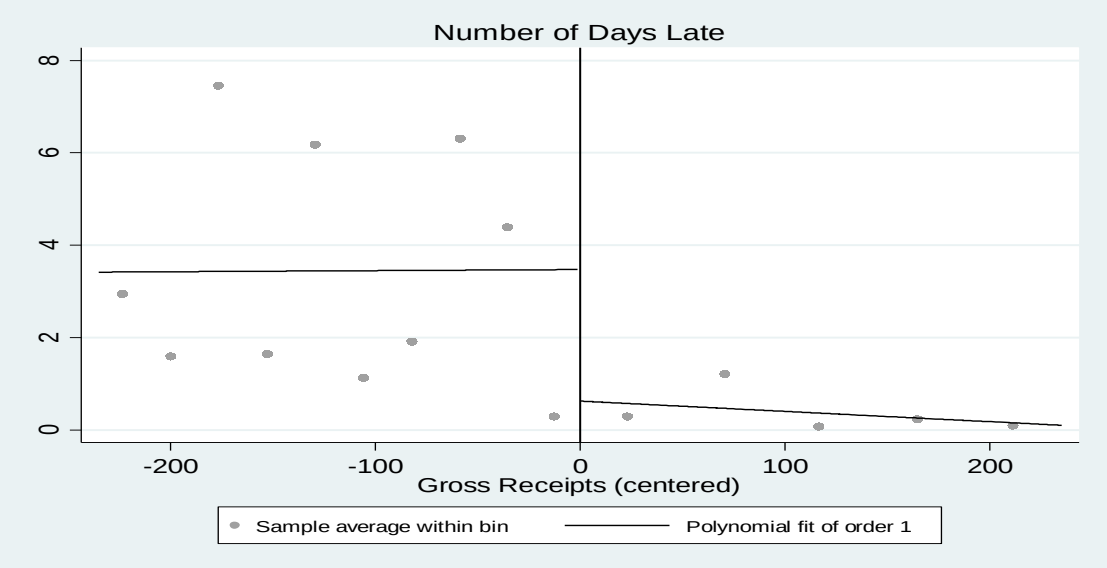
Note: Bandwidths are chosen to approximate the optimal (IK) bandwidth for the respective outcomes. RD Plots done using the default IMSE – evenly spaced (ES) method with spacing estimators Calonico et al. (2014b). The approach fits linear regression curves that approximate the conditional means of the outcome variable to the left and right of the cut off.

Figure 5:

Panel A: Probability GCT is Filed Late



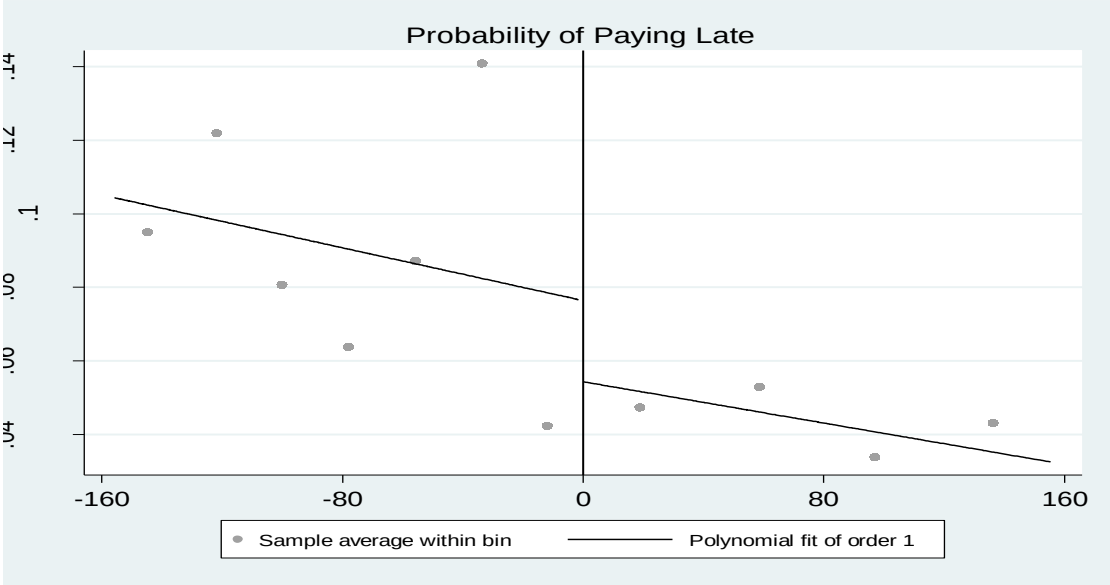
Panel B: Number of Days GCT is Filed Late



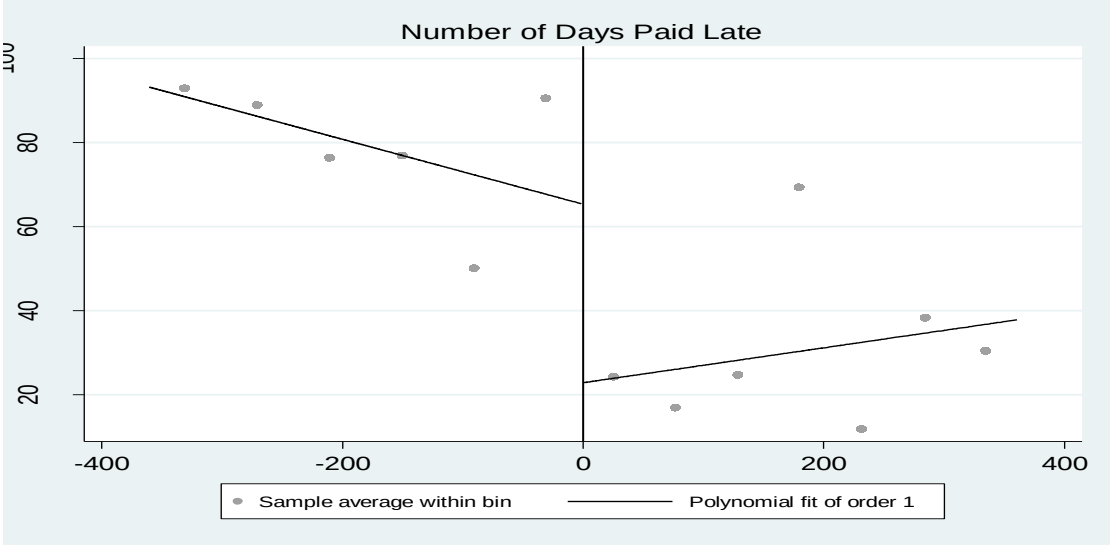
Notes: Bandwidths are chosen to approximate the optimal (IK) bandwidth for the respective outcomes. RD plots done using Calonico et al. (2014b) IMSE – evenly spaced (ES) method using spacing estimators (ES). The approach fits linear regression curves that approximate the conditional means of the outcome variable to the left and right of the cut off.

Figure 6

Panel A: Probability that GCT is Paid Late



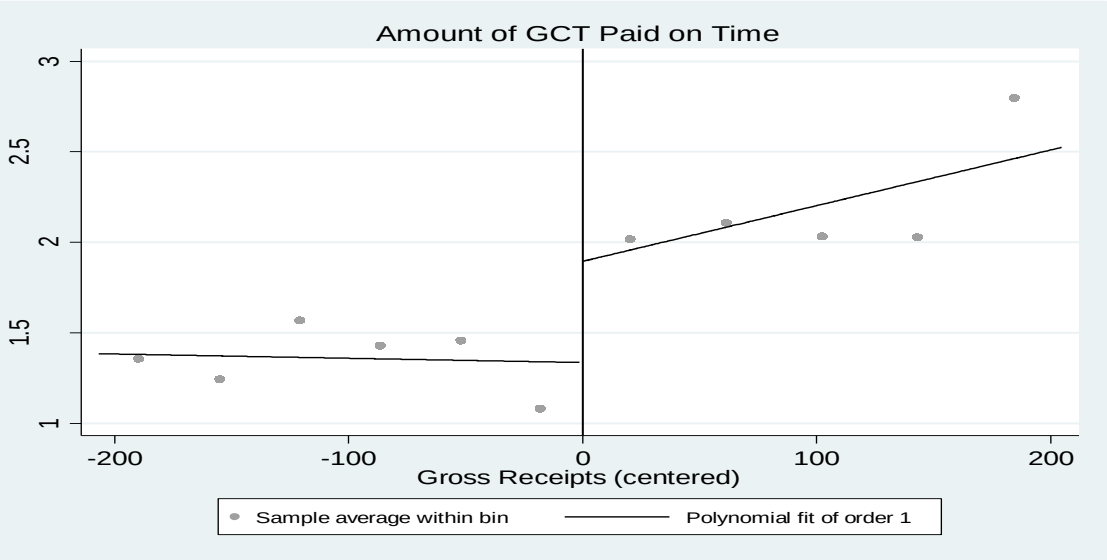
Panel B: Number of Days Late GCT is Paid



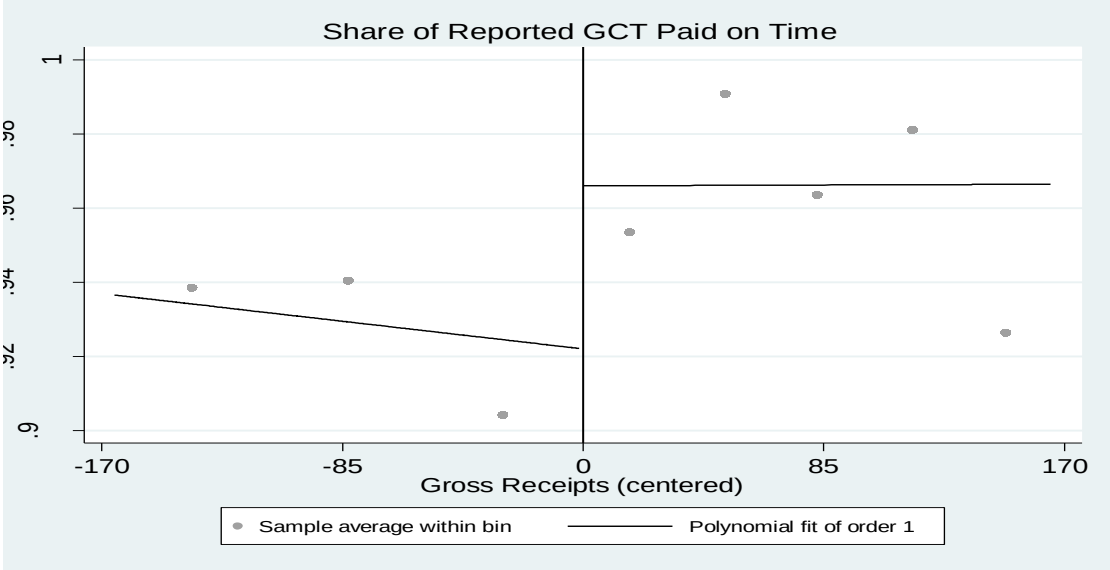
Notes: Bandwidths are chosen to approximate the optimal (IK) bandwidth for the respective outcomes. RD plots done using Calonico et al. (2014b) IMSE –evenly spaced (ES) method using spacing estimators (ES). The approach fits linear regression curves that approximate the conditional means of the outcome variable to the left and right of the cut off.

Figure 7

Panel A: Amount of GCT Paid on Time



Panel B: Share of Reported GCT Paid on Time



Notes: Bandwidths are chosen to approximate the optimal (IK) bandwidth for the respective outcomes. RD plots done using Calonico et al. (2014b) IMSE –evenly spaced (ES) method using spacing estimators (ES). The approach fits linear regression curves that approximate the conditional means of the outcome variable to the left and right of the cut off.

Appendix

Table A.1: Filing Compliance for All Taxpayers, Gross Receipts J$1 million – J$1 billion

	Probability of Filing Late			Days Filed Late		
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A - CIT Complaince						
LTO	0.472	0.0143	-0.426	5.904	1.128	232.7
	(1.719)	(0.297)	(12.90)	(71.33)	(44.11)	(797.0)
Bandwidth (J$ millions)	229	458	115	398	797	199
Observations	1,564	4,668	701	4,546	4,713	1,302
Year Dummy	no	no	no	no	no	no
Controls	no	no	no	no	no	no
Panel B - GCT Compliance						
LTO	0.509	-0.0490	0.264	8.343	-3.132	79.81
	(0.486)	(0.0965)	(0.379)	(17.91)	(8.272)	(70.07)
Bandwidth (J$ millions)	101	202	51	246	493	123
Observations	7,666	16,538	3,809	21,844	57,124	9,562
Year Dummy	no	no	no	no	no	no
Controls	no	no	no	no	no	no

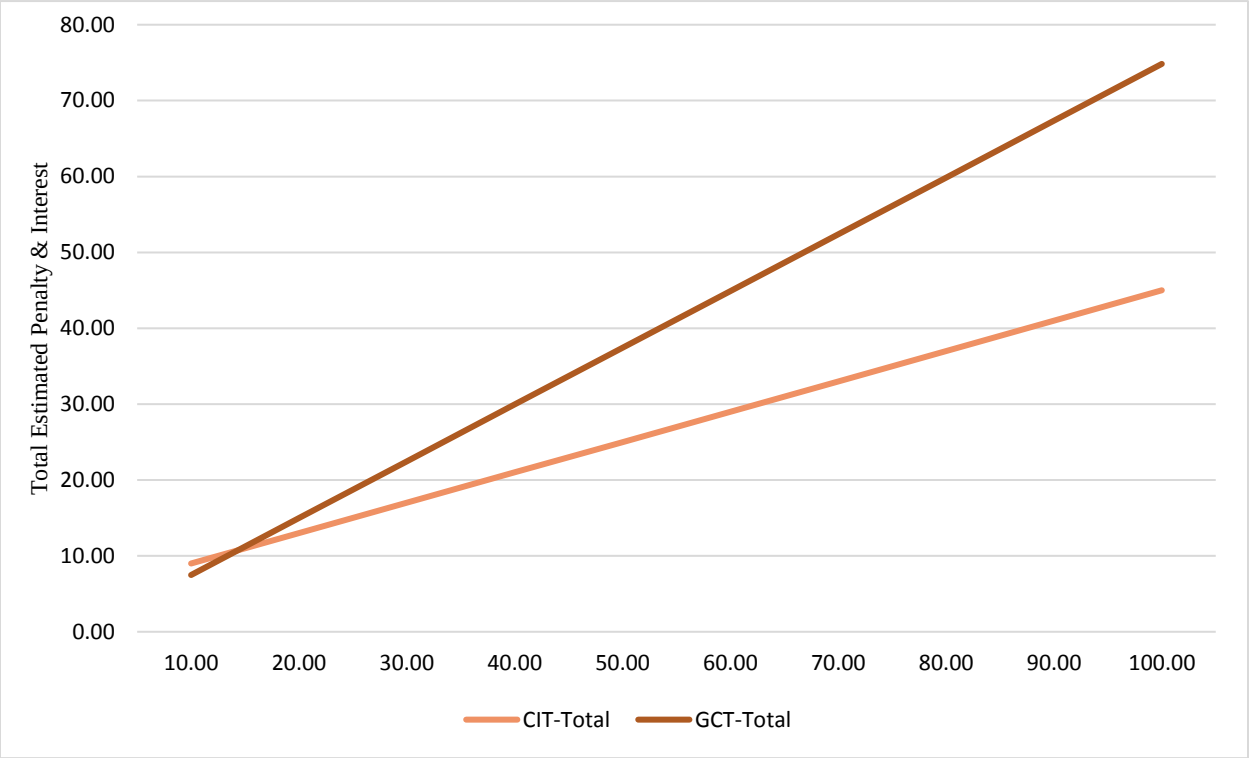
Notes: This table presents estimates for filing compliance outcomes for taxpayers with reported gross receipts between J$100 million and J$1 billion and includes taxpayers who report both positive and zero tax liability. Columns (1) – (3) present results for probability of late filing, for data within the optimal bandwidth (IK), a larger bandwidth (2 x IK) and a smaller bandwidth (½ x IK). Columns (4) – (5) present results for the number of days filed late, for the respective bandwidths. Regressions adopt a linear specification. Robust standard errors in parentheses.*p<0.10, **p<0.05, ***p<0.01.

Table A.2: Filing and Payment Compliance for Taxpayers who filed or paid both CIT and GCT

	Filed Late	No. of Days Filed Late	Paid Late	No. of Days Paid Late	Amount Paid on Time	Share Paid on Time
	(1)	(2)	(3)	(4)	(5)	(6)
Panel B - CIT Compliance						
LTO	-2.882	-489.0	-2.010	-1,585	-3.287	1.543
	(9.585)	(773.0)	(2.639)	(1,990)	(12.92)	(2.093)
IK Optimal Bandwidth (J$ Millior	240	283	295	306	480	303
Observations	749	930	726	766	1,395	756
Year Dummy	no	no	no	no	no	no
Controls	no	no	no	no	no	no
Panel A - GCT Compliance						
LTO	-0.255***	-3.124***	-0.231***	-307.3***	3.845***	0.257***
	(0.0588)	(1.120)	(0.0636)	(73.23)	(0.995)	(0.0726)
IK Optimal Bandwidth (J$ Millior	130	320	152	196	122	196
Observations	4,389	13,602	5,236	6,935	4,046	6,918
Year Dummy	no	no	no	no	no	no
Controls	no	no	no	no	no	no

Notes: This table presents estimates of filing and payment compliance for taxpayers who filed and paid both CIT and GCT for tax years 2009 – 2012. The columns show the outcome variables: probability of filing late, number of days filed late, probability of paying late, number of days paid late, amount paid on time and share of reported taxes paid on time. All estimates are based on their respective optimal bandwidths (IK). Regressions adopt a linear specification. Robust standard errors in parentheses.*p<0.10, **p<0.05, ***p<0.01.

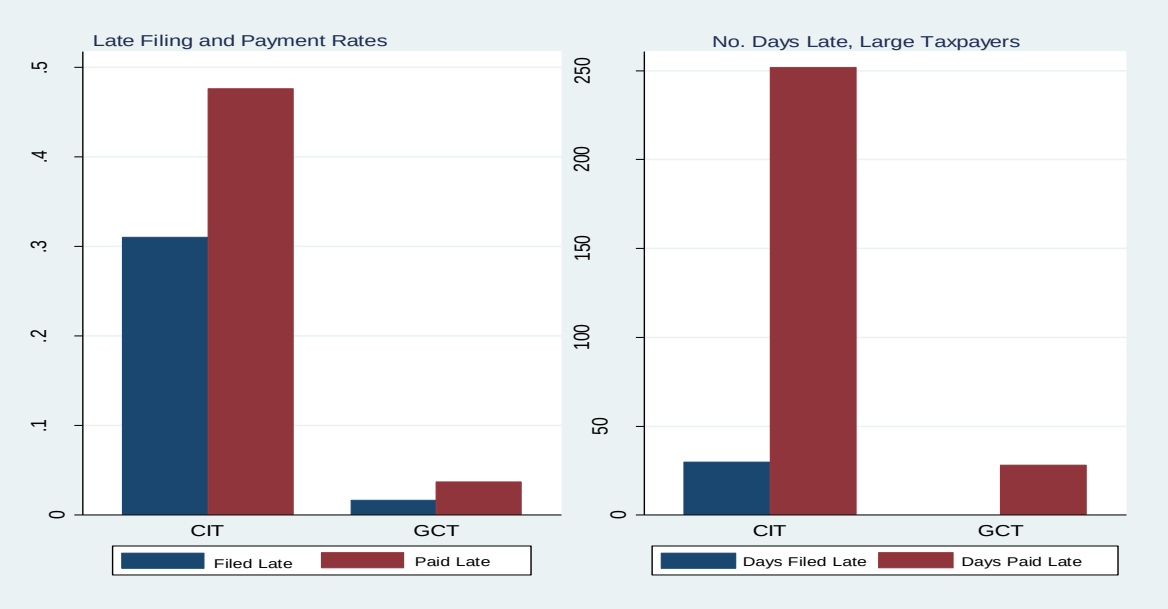
Figure A1: Estimates of Penalty and Interest by Unpaid Tax Liability for CIT and GCT



Note: Figure shows estimated penalty and interest for unpaid and unfiled taxes (x – axis) for the CIT and GCT, for a 12 month period. Estimates are based on the statutory penalty and interest rates for the respective taxes. Estimates do not include surcharges or any additional charge that taxpayers may incur and thus represents a lower bound estimate

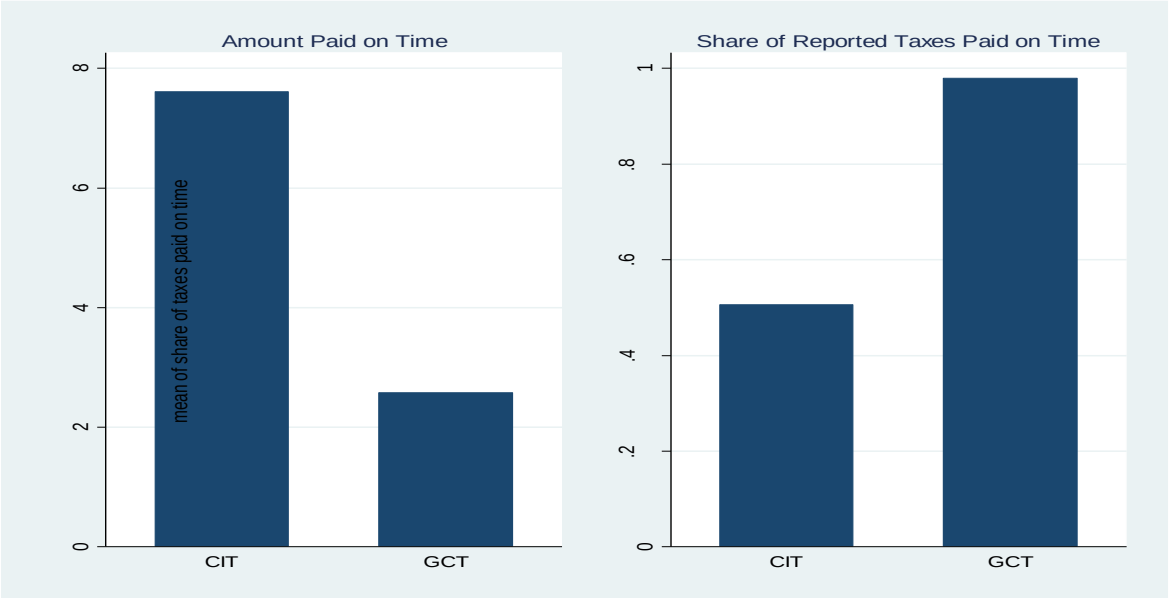
Figure A2

Panel A: CIT and GCT Filing and Payment Coplaince Rates for LargeTaxpayers



Notes: Figure shows filing and payment compliance for taxpayers with reported gross receipts between J$500 million and J$1 billion who filed or paid both CIT and GCT for tax years 2009 – 2012. Column (1) shows the rate of late filing and payment for the CIT and GCT. Column (2) shows the number of days late that CIT and GCT is filed and paid.

Panel B: CIT and GCT 'Money' Payments, LargeTaxpayers



Notes: Figure shows payment compliance for taxpayers with reported gross receipts between J$500 million and J$1 billion who filed or paid both CIT and GCT for tax years 2009 – 2012. Column (1) shows the amount of CIT and GCT paid on time and column (2) shows the share of reported CIT and GCT paid on time.

Figure A3: Density Plot Gross Receipts for Large Taxpayers

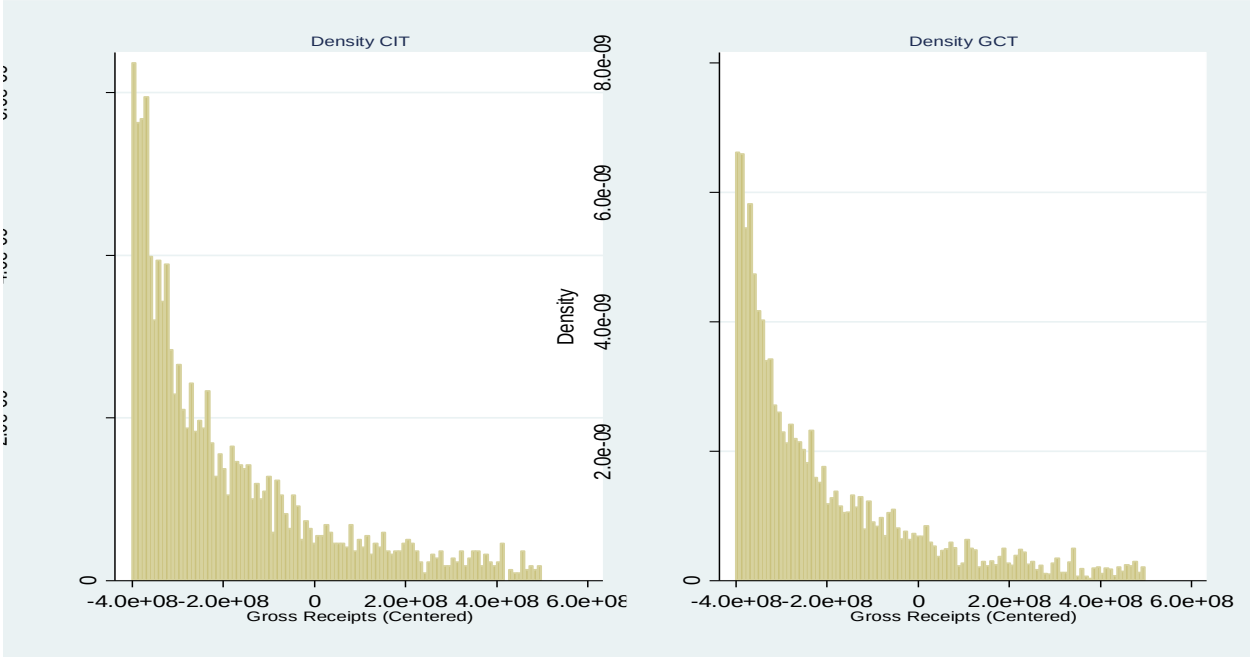


Figure A4: McCrary Test of Density Manipulation around the Threshold for the CIT and GCT

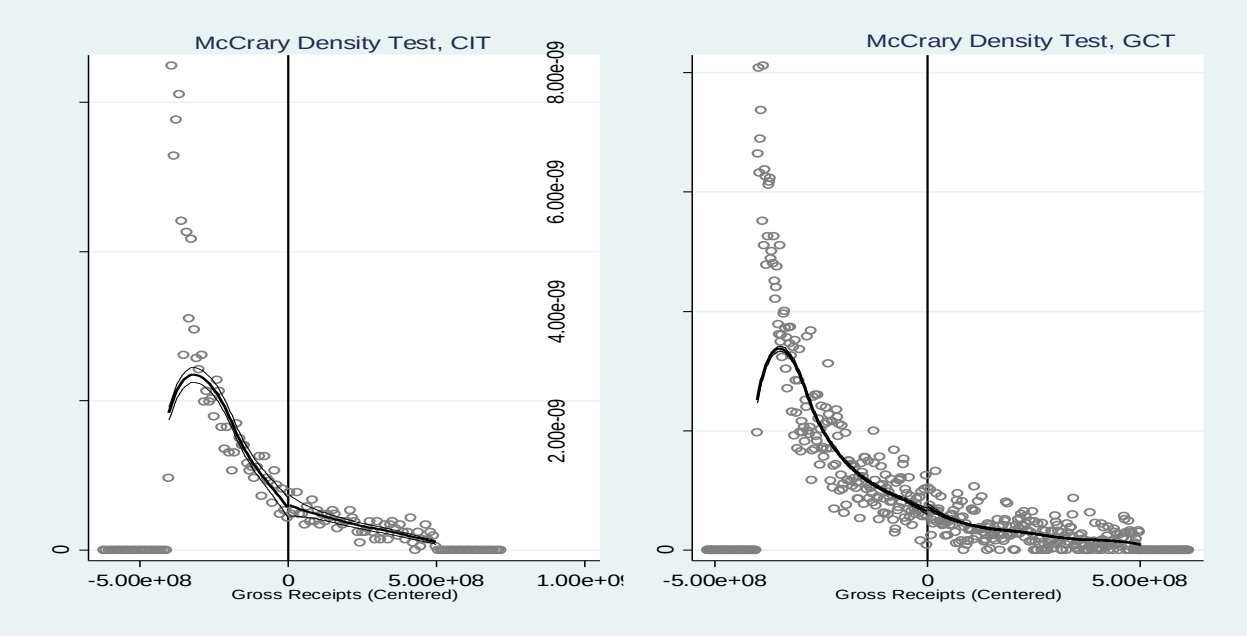
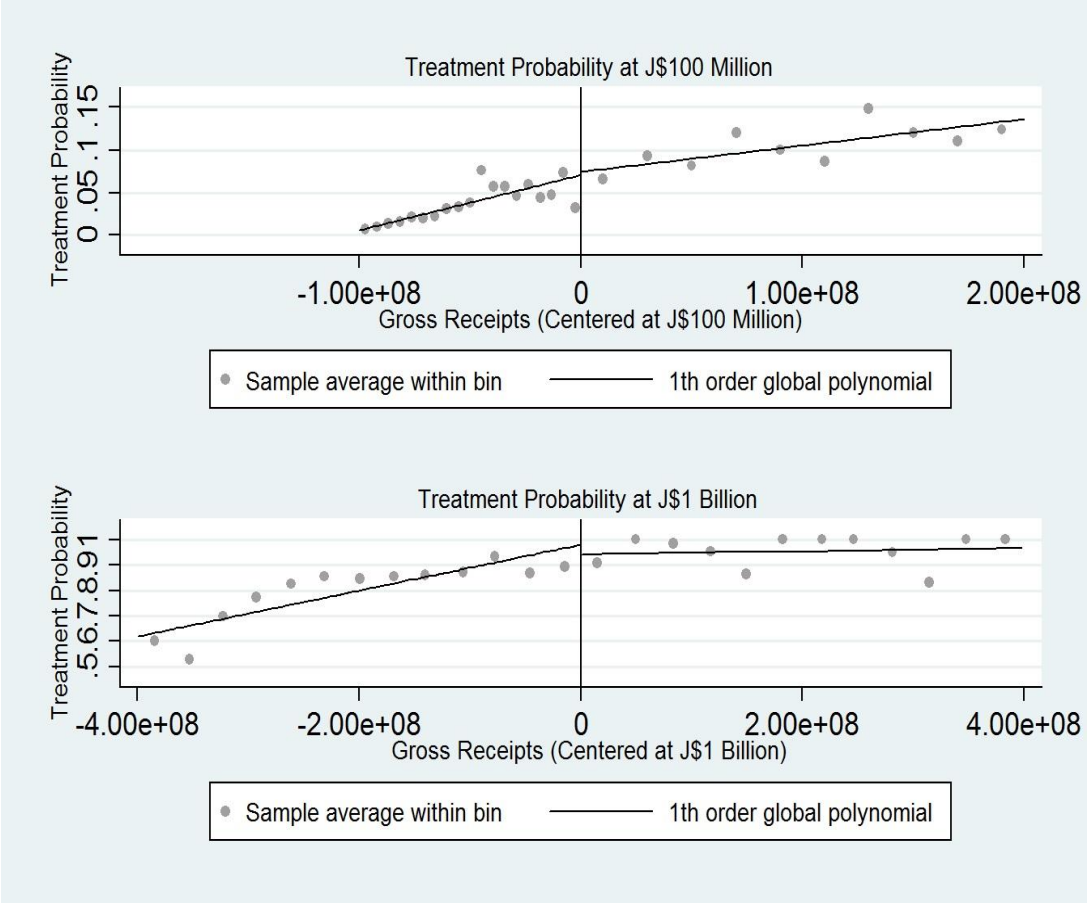
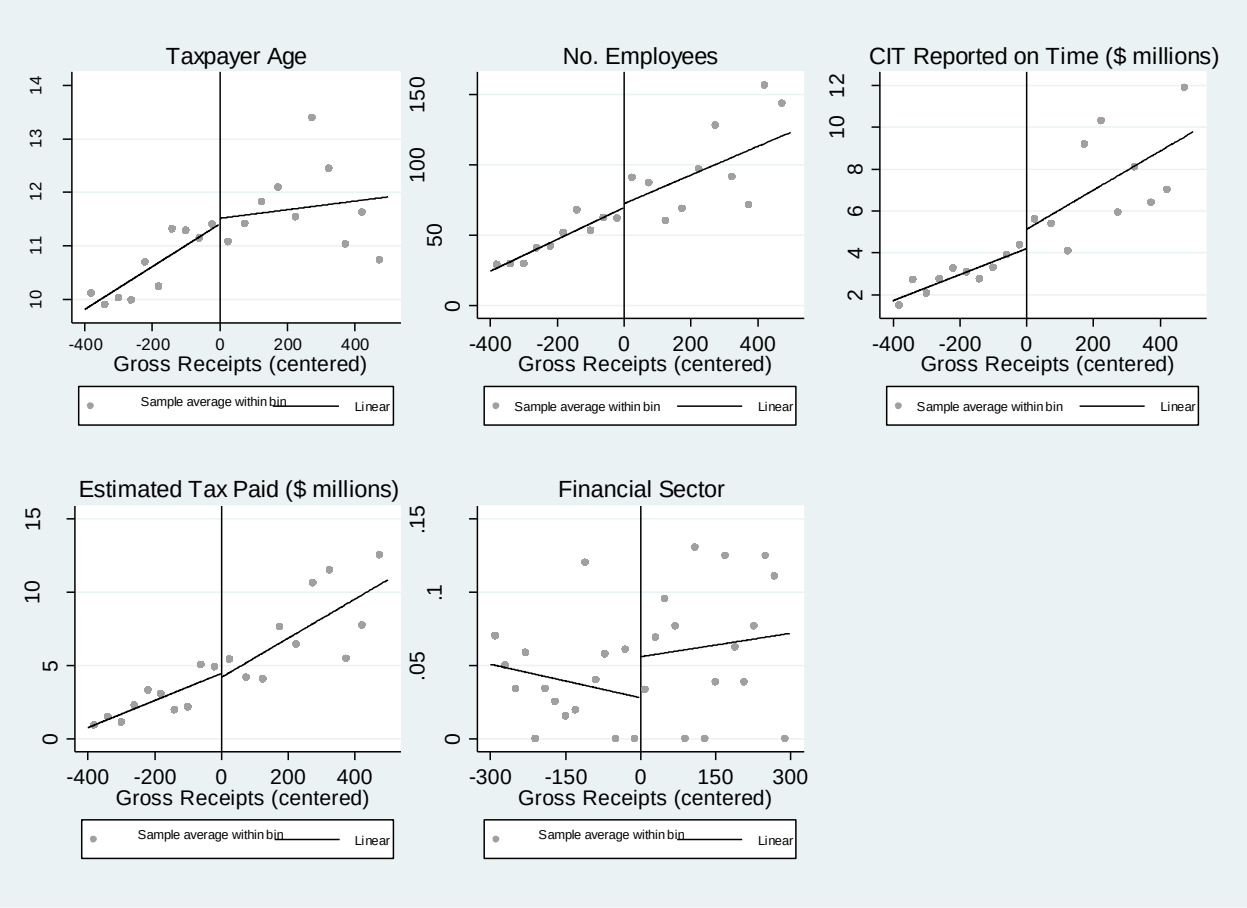


Figure A5: Test for Discontinuity in Treatment Probability of Treatment at the Placebo Thresholds of J$100 Million and J$1 Billion



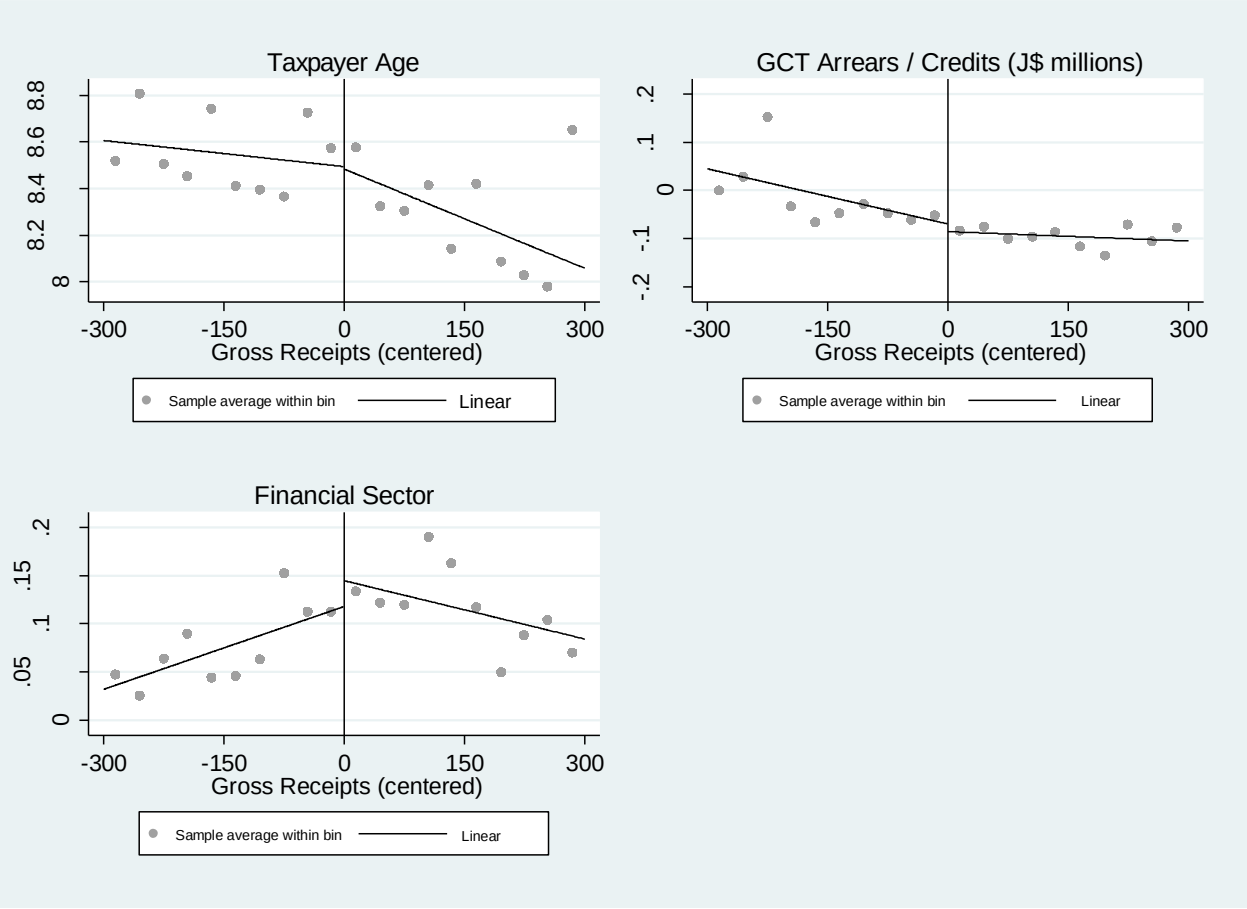
Notes: The placebo thresholds of J$100 million and J$1 billion were chosen to match TAJ's classification schedule for 'small' and 'large' taxpayers. TAJ classifies taxpayers with gross receipts less than or equal to J$100 million as small and those with gross receipts of J$1 billion or more as 'large'.

Figure A6: Treatment Probability for Key Economic Sector for the CIT



Notes: RD plots done using integrated mean squared-error (IMSE) – equally spaced (ES) method with spacing estimators (Calonico et al., 2014a). The approach fits a local linear regression that approximates the conditional mean of the outcome variable (firm characteristics) to the left and right of the cut off.

Figure A7: Tests for Discontinuity in Taxpayer Characteristics, GCT



Notes: RD plots done using integrated mean squared-error (IMSE) – evenly spaced (ES) method with spacing estimators (Calonico et al.; 2014a). The approach fits a local linear regression that approximates the conditional mean of the outcome variable (firm characteristics) to the left and right of the cut off.